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REVISIONS

TO

MONTANA
DEPARTMENT OF HIGHWAYS

STANDARD DRAWINGS

1984 EDITION

PLEASE RETURN

Revision of:

November 1, 1991

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MONTANA
DEPARTMENT OF TRANSPORTATION

NOTICE CONCERNING REVISIONS TO THE 1984 EDITION OF THE STANDARD DRAWINGS

The following Signing Drawings are to be added to the Standard Drawing Book you now have. These drawings affect those projects let to contract after November 1, 1991.

619-00	SIGN CLEARANCES AND MOUNTING HEIGHTS
619-02	TYPICAL RURAL AND URBAN APPROACH
619-04	ALUMINUM SHEET INCREMENT SIGN CONST. DETAILS
619-06	PLYWOOD SHEET INCREMENT GUIDE SIGN CONST. DETAILS
619-08	GUIDE SIGN CLEARANCE AND MOUNTING DETAILS
619-10	SHEET ALUMINUM OVERLAY
619-12	TUBULAR SIGN POST DETAILS
619-14	2" & 2½" DIA. PIPE POST BREAKAWAY DETAIL
619-16	TYPICAL PIPE POST MOUNTING DETAILS
619-18	CANTILEVER TYPE SIGN SUPPORT DETAILS FOR SIDEWALK AREAS
619-20	TREATED TIMBER POLE SIGN SUPPORT DETAILS
619-22	OPTIONAL BACK BRACING FOR SIGNS
619-24	CHEVRON MOUNTING DETAILS
619-26	SPECIAL DESIGN PRIMARY & SECONDARY ROUTE MARKER PANELS & SHIELDS
619-30	SIGN HINGE DETAILS
619-32	MILEPOST DETAILS
619-34	DELINEATOR DETAILS
619-36	DELINEATOR PLACEMENT DETAILS
619-38	OBJECT MARKER DESIGN AND PLACEMENT DETAILS
619-40	GUIDE POST DESIGN AND PLACEMENT DETAILS
619-42	PERMANENT BARRICADE DESIGN DETAILS
619-44	INSTALLATION DATE TAGS

The following Standard Drawings have been replaced by new drawings or are no longer required.

215	226	241
216	227	242
217	228	243
219	232	244
220	233	245
221	234	246
223	235	251
224	236	252
225	237	256

Users of these Standard Drawings are advised to carefully examine each drawing.

Wayne H. Walters, P.E., Supervisor
Contract Plans Section

WHW:JPK:Q:CP:258.mb

Standard Drawing Section & Title	Std. Dwg. Number	Effective Date	Reference to Std. Spec. Section No.
CONSTRUCTION SIGNING (Continued)			
Construction Signing Standards - Barricades	210	4/1/84	618,619
TYPICAL CLEARANCE & PLACEMENT SPECIFICATION			
Sign Clearances & Mounting Heights	619-00	11/1/91	619
Typical Rural & Urban Approach	619-02	11/1/91	619
GUIDE SIGN CONSTRUCTION & MOUNTING			
Aluminum Sheet Increment Sign Const. Details	619-04	11/1/91	619,704
Plywood Sheet Increment Guide Sign Const. Detail	619-06	11/1/91	619,704
Guide Sign Clearance & Mounting Details	619-08	11/1/91	619,704
Sheet Aluminum Overlay	619-10	11/1/91	619
STEEL POST BREAKAWAY			
Tubular Sign Post Details	619-12	11/1/91	556,619,704
2" & 2½" Ø Pipe Post Breakaway Detail	619-14	11/1/91	556,619,704
SIGN MOUNTING - FOR PIPE POST AND BARN POLE			
Typical Pipe Post Mounting Details	619-16	11/1/91	556,619,704
Cantilever Type Sign Support Details	619-18	11/1/91	556,619,704
Treated Timber Pole Sign Support Details	619-20	11/1/91	619,704

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Standard Drawing Section & Title	Std. Dwg. Number	Effective Date	Reference to Std. Spec. Section No.
SPECIAL DESIGN DETAILS			
Optional Back Bracing for Signs	619-22	11/1/91	619
Chevron Mounting Details	619-24	11/1/91	619
Special Design Primary & Secondary Route Marker Panels and Shields	619-26	11/1/91	619
Sign Hinge Details	619-30	11/1/91	619,704
MILEPOST, DELINEATOR, OBJECT MARKER, GUIDE POST, & BARRICADES			
Milepost Details	619-32	11/1/91	619
Delineator Details	619-34	11/1/91	619
Delineator Placement	619-36	11/1/91	619
Object Marker Design and Placement Details for Obstructions Adjacent to or within Highways	619-38	11/1/91	619
Guide Posts Design and Placement Details	619-40	11/1/91	619
Permanent Barricade Design Details	619-42	11/1/91	619
INSTALLATION DATE TAGS			
Installation Date Tags	619-44	11/1/91	619
GUARDRAIL			
Concrete Median Rail	84	4/1/84	606
Cable Guardrail	90	3/1/72	606

MONTANA CADD
20-SEP-1991 15:57
TRSG2
ZF21[040004]TRFSTD.TRS;2

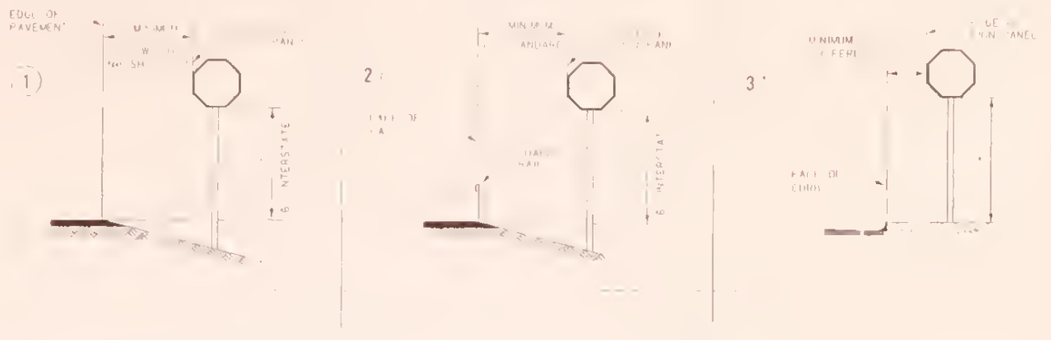
RURAL

RURAL WITH GUARD RAIL

URBAN

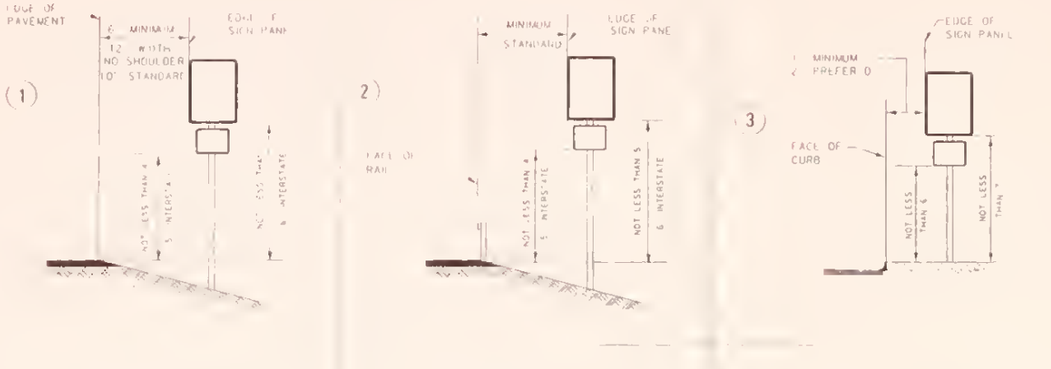
REGULATORY

RI-1 / RI-2

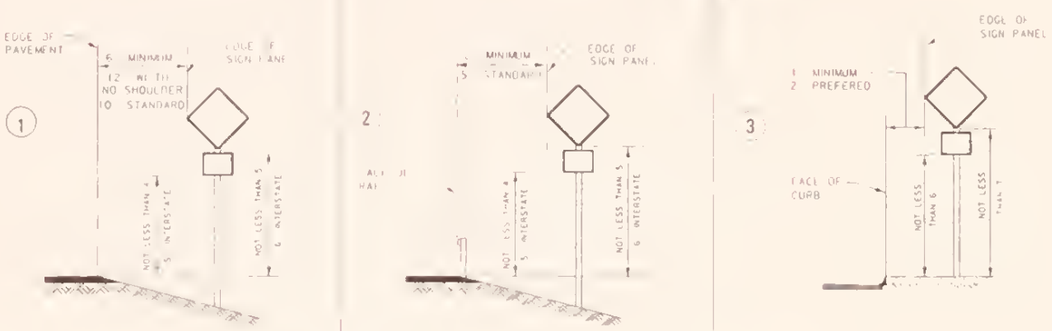


REGULATORY

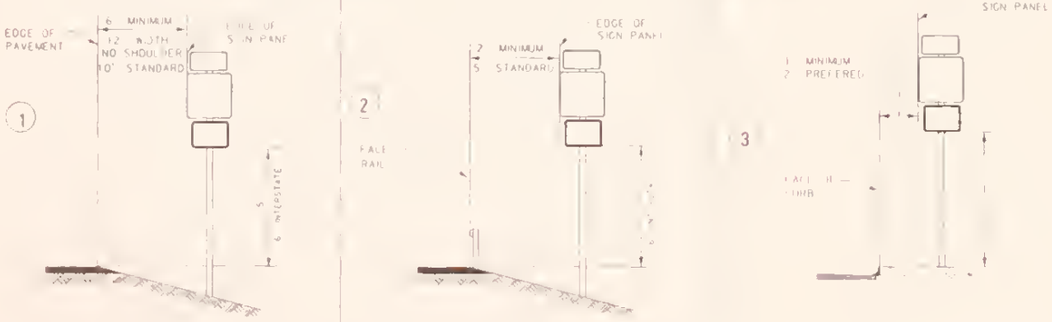
EXCEPT RI-1 / RI-2



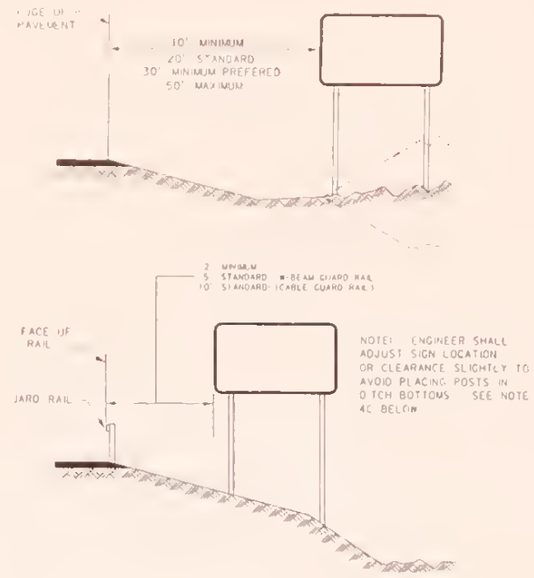
WARNING



ROUTE MARKERS

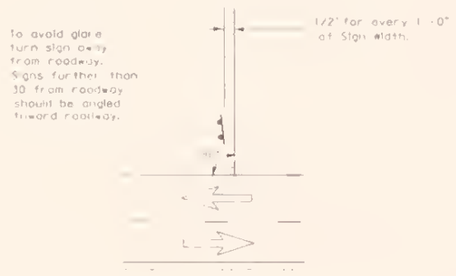


GUIDE SIGNS


EDGE OF PAVEMENT
10' MINIMUM
20' STANDARD
30' MINIMUM PREFERED
50' MAXIMUM
2' MINIMUM
5' STANDARD W-BEAM GUARD RAIL
10' STANDARD (CABLE GUARD RAIL)
FACE OF RAIL
GUARD RAIL
NOTE: ENGINEER SHALL ADJUST SIGN LOCATION OR CLEARANCE SLIGHTLY TO AVOID PLACING POSTS IN DITCH BOTTOMS SEE NOTE 4C BELOW

NOTES

1. INFORMATION CONTAINED HEREIN IS THE CLEARANCES AND MOUNTING HEIGHTS THAT SHALL BE USED WHEN PLACING ALL SIGNS.
2. FOR REGULATORY, WARNING, AND ROUTE MARKER SIGNS AND THEIR ASSEMBLIES, ON HIGHWAYS OTHER THAN INTERSTATE:
   A). DIAGRAMS LOCATED IN COLUMN (1) SHALL BE USED WHEN PLACING THESE SIGNS IN STANDARD RURAL CONDITIONS; COLUMN (2) SHALL BE USED WHEN PLACING THESE SIGNS BEHIND GUARD RAIL IN RURAL CONDITIONS; COLUMN (3) SHALL BE USED WHEN PLACING THESE SIGNS IN URBAN CONDITIONS WHERE THERE IS ADEQUATE CLEARANCE AND SIDEWALK WIDTH.
   B). WHERE SIDEWALK WIDTH IS LIMITED IN URBAN CONDITIONS, SEE SIGNING STANDARD DRAWING NO. 619-18 FOR PLACEMENT DETAILS.
3. FOR REGULATORY (ALL OTHERS), WARNING AND ROUTE MARKER SIGNS, AND THEIR ASSEMBLIES, ON INTERSTATE HIGHWAYS, THE CLEARANCE SHOULD BE 20' FROM EDGE OF PAVEMENT IN COLUMN (1) FOR STANDARD RURAL CONDITIONS, THE CLEARANCES LISTED IN COLUMNS (2) AND (3) SHALL REMAIN AS SHOWN.
4. FOR GUIDE SIGNS, AND THEIR ASSEMBLIES:
   A). THE DIAGRAMS LOCATED ABOVE SHALL BE USED WHEN PLACING THESE SIGNS IN THE GIVEN RURAL CONDITIONS.
   B). FOR PLACEMENT OF THESE SIGNS IN URBAN CONDITIONS, SEE THE SIGN LOCATION AND SPECIFICATION SHEETS IN THE SIGNING PLANS FOR EACH INDIVIDUAL SIGN.
   C). THE MAXIMUM CLEARANCE OF THESE SIGNS SHALL NOT EXCEED 50' IN ANY CONDITION.
   D). SEE STANDARD DRAWING NO. 619-08 FOR MOUNTING HEIGHTS.
5. SIGNS TO BE MOUNTED WITHIN THE CITY LIMITS, IN A SIDEWALK AND CURB AREA, SHALL BE MOUNTED SO AS TO HAVE THE PROPER CLEARANCES, ALTHOUGH THE POST SHALL NOT CONFLICT WITH THE MAIN WALKING AREA OF THE SIDEWALK OR WITH DOORWAYS OR WINDOWS OF ADJACENT BUILDINGS. THE EXACT LOCATION OF THESE SIGN INSTALLATIONS SHALL BE DETERMINED BY THE ENGINEER. VARIOUS CANTILEVER TYPE MOUNTINGS ARE DETAILED IN SIGNING STANDARD DRAWING NO. 619-18.


to avoid glare turn sign away from roadway. *Signs further than 30 from roadway should be angled toward roadway.
1/2" for every 1'-0" of Sign width.

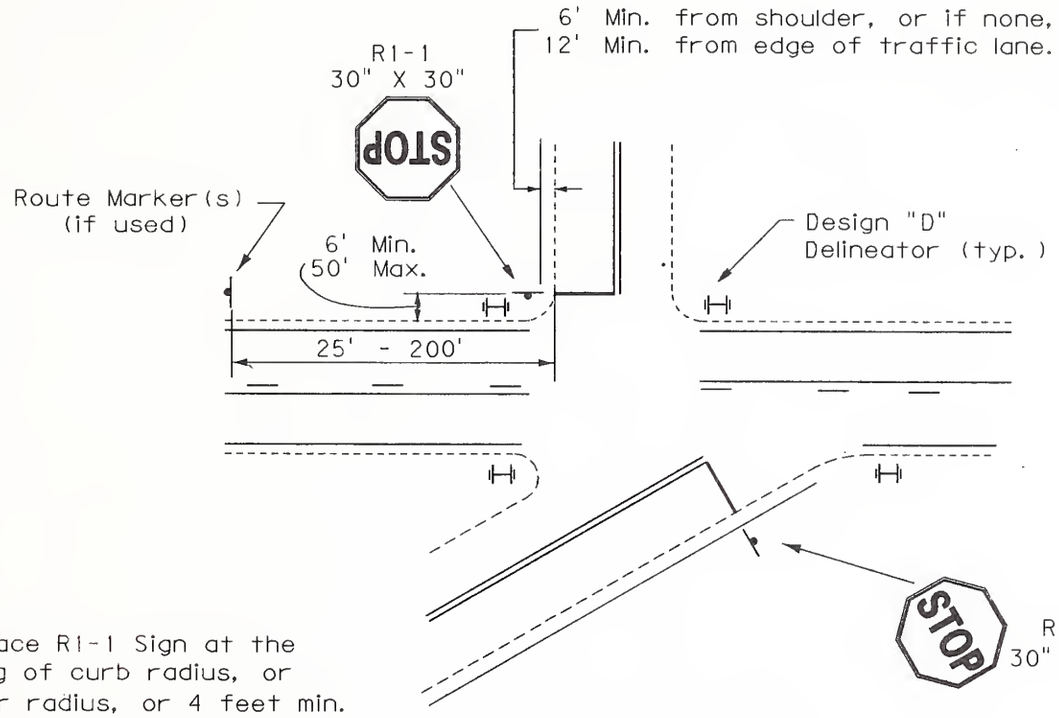
SKEW DIAGRAM

STANDARD DRAWING			
REFERENCE STANDARD SPEC. SECTION 619		DWG NO. 619-00	
SIGN CLEARANCES AND MOUNTING HEIGHTS			
APPROVED BY ADMINISTRATOR-HIGHWAY DIVISION			
REVISED			
EFFECTIVE	11-1-91		

TYPICAL APPROACH ROAD SIGNING

MONTANA CADD
20-SEP-1991 15:56 TRSG2
ZF2:[040004]TRFSTD.TRS;2

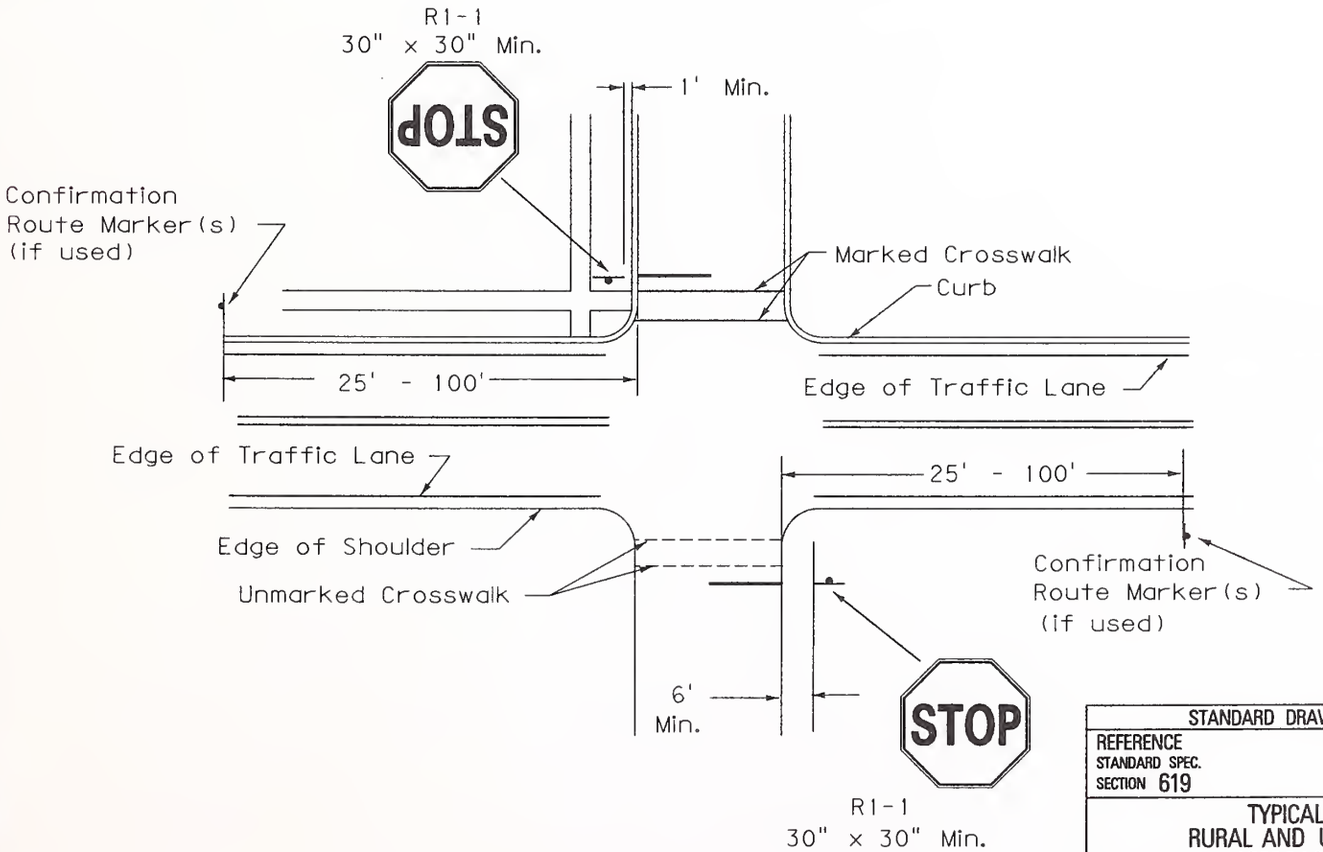
RURAL



NOTE:

Place R1-1 Sign at the begining of curb radius, or shoulder radius, or 4 feet min. in advance of the marked or unmarked Crosswalk.

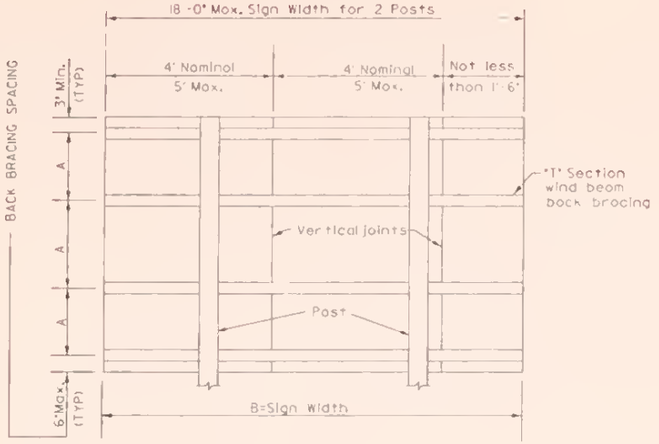
URBAN

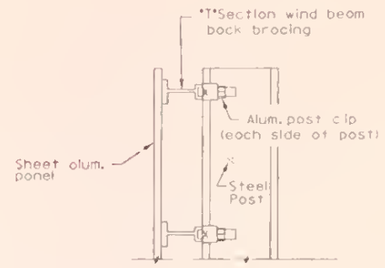


STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG. NO. 619-02
TYPICAL RURAL AND URBAN APPROACH	
APPROVED BY Thomas J. Barnard ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE	11-1-91

ALUMINUM SHEET INCREMENT

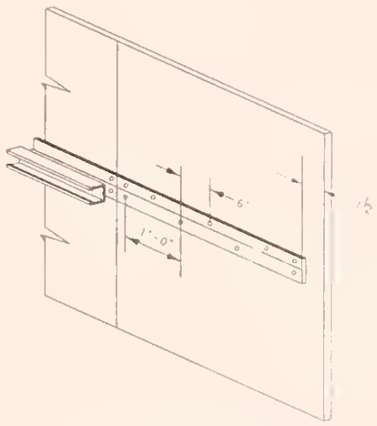
SIGN DETAILS





NOTES:

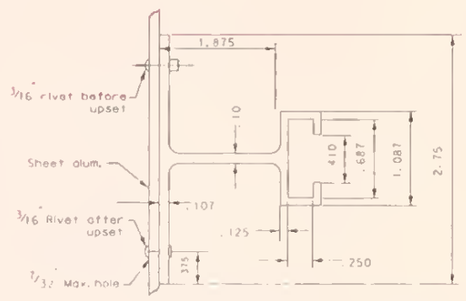
1. ALL ALUMINUM SIGNS SHALL CONFORM TO SECTIONS 619, 704.01(A) AND 704.01(B) OF THE STANDARD SPECIFICATIONS.
2. SIGNS LESS THAN 4' - 0" HIGH AND 6' - 0" LONG SHALL BE MADE OF A SINGLE SHEET OF ALUMINUM.
3. SIGNS UP TO, AND INCLUDING, 6' - 0" HIGH SHALL HAVE NO HORIZONTAL JOINTS, AND NO SHEET SHALL BE LESS THAN 1' - 6" WIDE.
4. SIGNS OVER 6' - 0" HIGH MAY HAVE HORIZONTAL AND VERTICAL JOINTS, HOWEVER NO SHEET SHALL BE LESS THAN 1' - 6" WIDE OR 1' - 6" HIGH.
5. CLEAN AND DRY POST CLIP NUTS THEN TORQUE TO 225 IN/LB.



RIVET SPACING DETAIL

NOTES:

Rivets at 6" alternate centers on horizontal extruded T-Section.
Rivets doubled (top and bottom or left and right of extruded T - Section) at horizontal and vertical joints in sheet aluminum face and at ends of extruded T Section.



EXTRUDED "T" SECTION
BACK BRACING

BACKBRACING TABLE – ALUMINUM SIGNS			
BACK BRACING SPACING "A"	MAXIMUM WIDTH (B)		✳ PLATE THICKNESS
	2 POST	3 POST	
1' - 8"	18' - 0"	27' - 0"	.063"
1' - 10"	17' - 0"	25' - 8"	.063"
2' - 0"	16 - 6"	24' - 8"	.063"
2 6"	14' - 9"	22 - 0"	.080"
3' - 0"	13' - 6"	20' - 0"	.100"
3' - 6"	12' - 6"	18' - 6"	.125"

✳ ALUMINUM PLATE THICKNESS SHOWN IS FOR INFORMATION ONLY. SEE SECTION 704.01 OF THE STANDARD SPECIFICATIONS TO DETERMINE PLATE THICKNESS REQUIREMENTS.

NOTES:

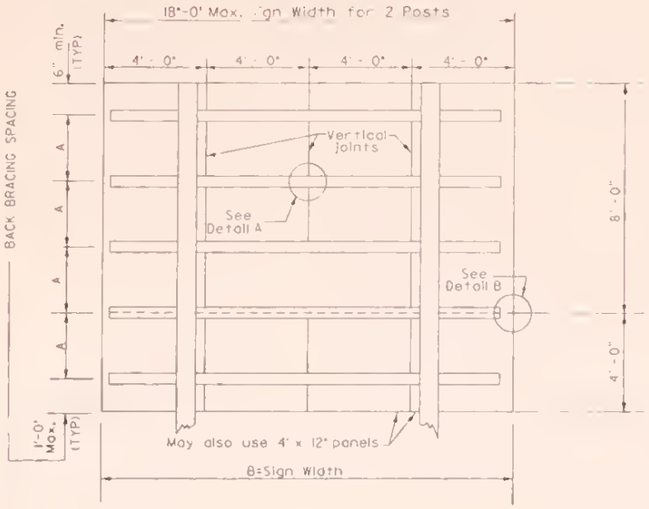
ALL HORIZONTAL JOINTS SHALL OCCUR AT A "T" SECTION.
NO SPLICES ARE ALLOWED IN EXTRUDED "T" SECTIONS.
ALL SCREWS, BOLTS, AND LOCKWASHERS SHALL BE OF ALUMINUM ALLOY, STAINLESS STEEL, OR CADMIUM PLATED STEEL.
ONLY ALUMINUM RIVETS SHALL BE USED.

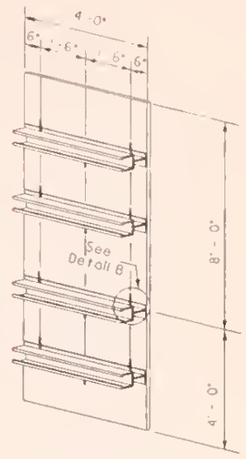
STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619,704	DWG. NO. 619-04
ALUMINUM SHEET INCREMENT SIGN CONSTRUCTION DETAILS	
APPROVED BY ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE 11-1-91	

CADD TRSG2
[F2:[040004]TRFSTD_TRS]2

20-SEP-1991
15:57
TRSG2
EF2:[040004]TAFSTD.TFS;2
MONTANA CADD

PLYWOOD SHEET INCREMENT
GUIDE SIGN DETAILS

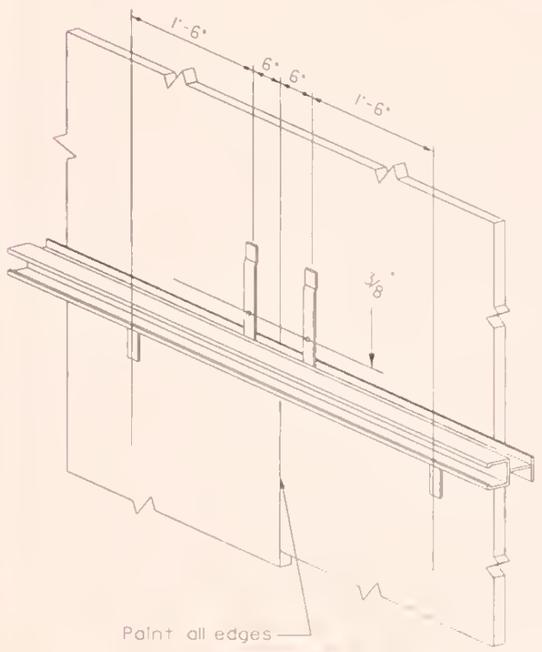




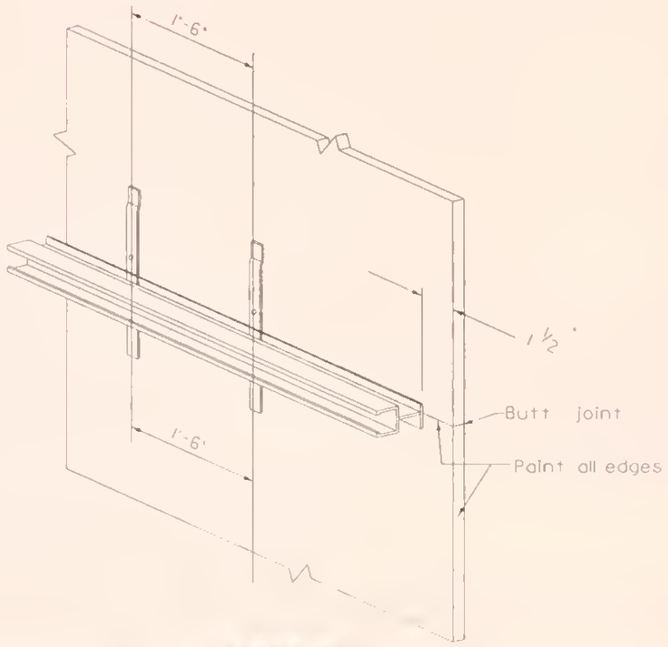
DETAIL
(Aluminum Clip placement)

NOTES:

1. ALL PLYWOOD SIGNS SHALL CONFORM TO SECTIONS 619, 704.01(C) & 704.02(B) OF THE STANDARD SPECIFICATIONS.
2. SIGNS 4'-0" HIGH OR GREATER SHALL HAVE NO PANEL LESS THAN 4'-0" IN HEIGHT.
3. SIGNS UNDER 4'-0" HIGH SHALL NOT HAVE HORIZONTAL JOINTS.
4. SIGNS WITH WIDTHS THAT ARE NOT IN MULTIPLES OF 4'-0" SHALL HAVE ODD PANEL ON INSIDE EDGE.
5. FOR SIGNS OVER 10'-0" IN HEIGHT, THE FULL HEIGHT MAY BE OBTAINED WITH PANELS HAVING A FACTORY SCARFED JOINT IN LIEU OF USING STANDARD LENGTH PANEL AS SHOWN.
6. NO INDIVIDUAL PANEL SHALL BE SMALLER THAN 1'-6" WIDE BY 4'-0" HIGH.
7. PLYWOOD SIGNS SHALL BE MADE OF ONE PIECE OF PLYWOOD UNLESS THE PLANS SPECIFY OTHERWISE FOR SPECIAL DESIGN SIGNS.

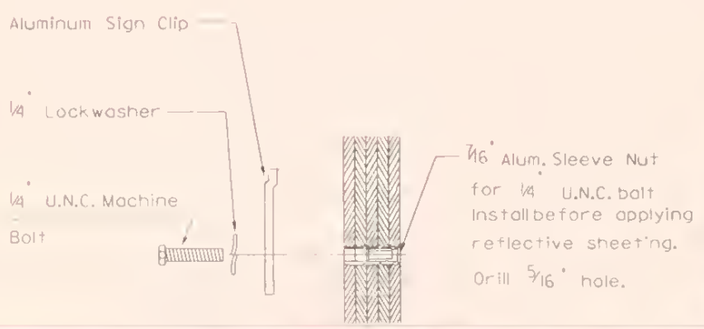


DETAIL A
(Vertical joint)



DETAIL B
(Horizontal joint)

BACKBRACING TABLE – PLYWOOD SIGNS		
BACK BRACING SPACING "A"	MAXIMUM WIDTH (B)	
	2 POST	3 POST
1' - 8"	18' - 0"	27' - 0"
1' - 10"	17' - 0"	25' - 8"
2' - 0"	16' - 6"	24' - 8"
2' - 6"	14' - 9"	22' - 0"
3' - 0"	13' - 6"	20' - 0"
3' - 6"	12' - 6"	18' - 6"


Aluminum Sign Clip
1/4" Lockwasher
1/4" U.N.C. Machine Bolt
7/16" Alum. Sleeve Nut for 1/4" U.N.C. bolt Installbefore applying reflective sheeting.
Drill 5/16" hole.

DETAIL OF CLIP

STANDARD DRAWING

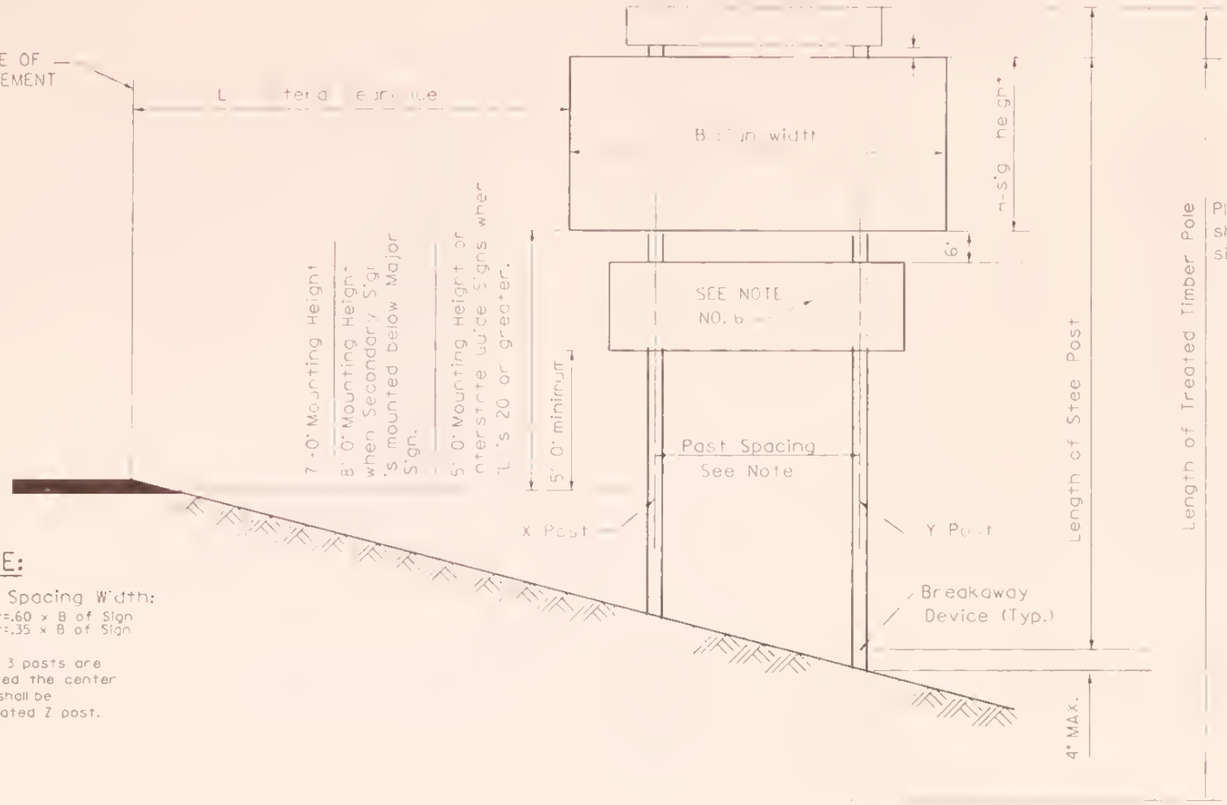
REFERENCE STANDARD SPEC. SECTION 619,704	DWG. NO. 619-06

PLYWOOD SHEET INCREMENT GUIDE SIGN CONSTRUCTION DETAILS

APPROVED BY
ADMINISTRATOR-HIGHWAY DIVISION

REVISED				
EFFECTIVE	11-1-91			

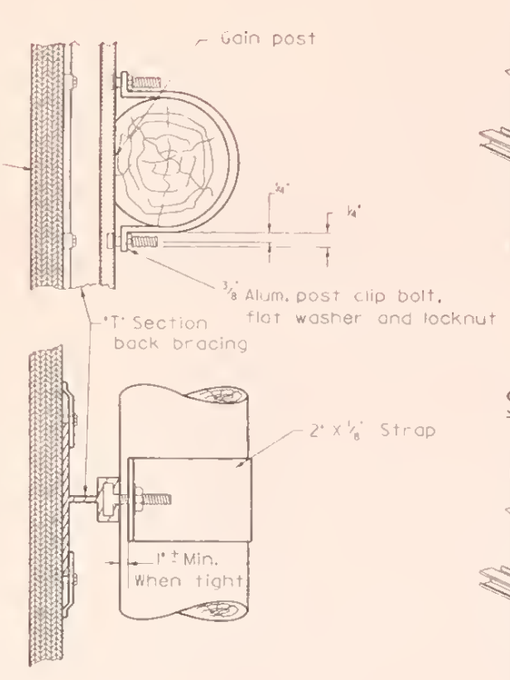
GUIDE SIGN MOUNTING DETAILS



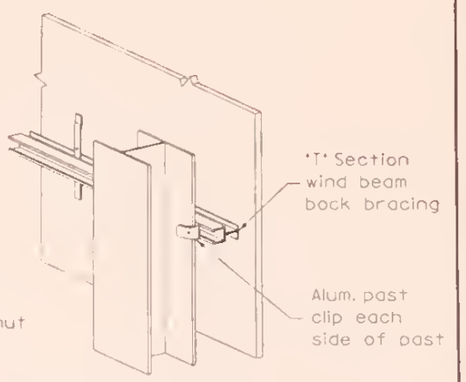
NOTE:

Post Spacing Width:
2 Post=.60 x B of Sign
3 Post=.35 x B of Sign

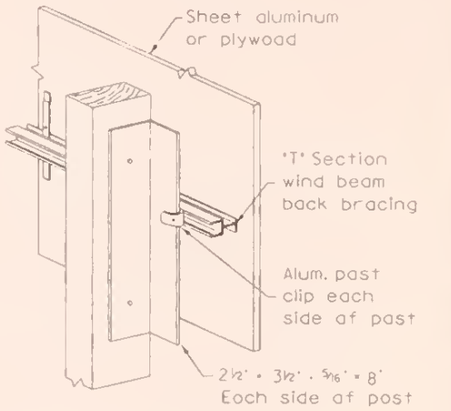
Where 3 posts are required the center post shall be designated Z post.


Gain post
Plywood or sheet aluminum sign face
¾"
¼"
⅜" Alum. post clip bolt, flat washer and locknut
"T" Section back bracing
2" x ⅛" Strap
1" ± Min. When tight

TREATED TIMBER POLE



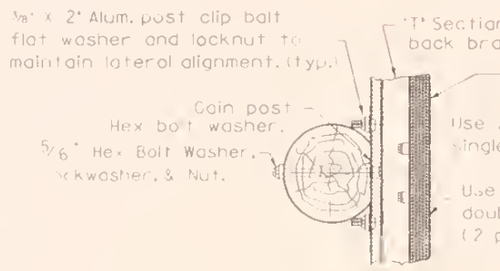
STEEL POST



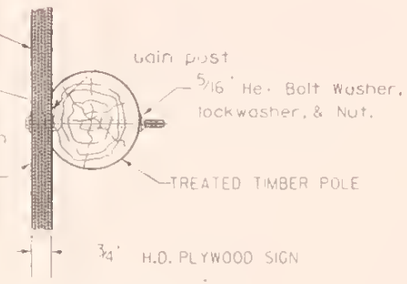
TREATED TIMBER POST

NOTES:

1. Mounting systems shown are typical. Other systems may be approved by the engineer.
2. All steel hardware shall be galvanized, stainless or cadmium plated.
3. Type and half of pole to be gained according to the table on Standard Dwg. No. 619-20.
4. Type of posts and foundations will be noted in signing quantities.
5. Plywood signs may be mounted directly to wood poles, when those poles are specified in the plans, by bolting through the sign plate and the pole with cadmium plated bolts as required by the standards and design. "T" section wind beams shall be used when required by Standard Drawing No. 619-06.
6. Any Supplemental signs added after initial sign installation must be suspended from major sign panel or backbracing. Attachment to post/poles is not allowed.


⅜" x 2" Alum. post clip bolt flat washer and locknut to maintain lateral alignment. (Typ.)
"T" Section back bracing
Gain post
Hex bolt washer.
5/16" Hex Bolt Washer, lockwasher, & Nut.

DOUBLE POST MOUNT


Sign face
Use 2 bolts per sign on single post mountings
Use 4 bolts per sign on double post mountings. (2 per post)
Gain post
5/16" Hex Bolt Washer, lockwasher, & Nut.
TREATED TIMBER POLE
¾" H.D. PLYWOOD SIGN

TREATED TIMBER POLE SINGLE OR DOUBLE

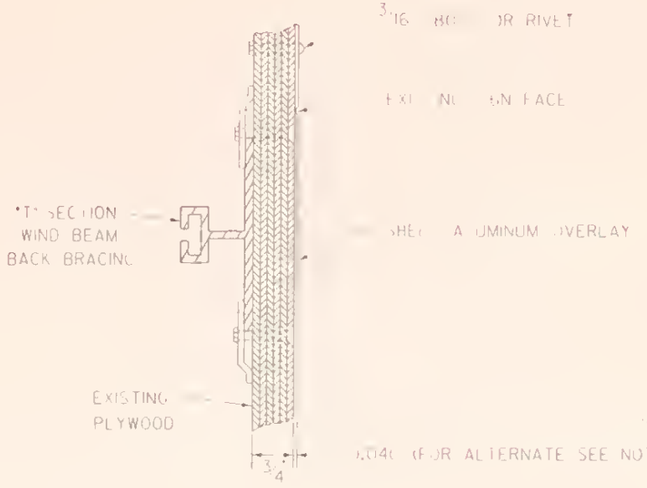
(Used When "T" Bar Wind Beams Not Required.)

STANDARD DRAWING	
REFERENCE STANDARD SPEC SECTION 619,704	DWG. NO. 619-08
GUIDE SIGN CLEARANCE AND MOUNTING DETAILS	
APPROVED BY ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE	11-1-91

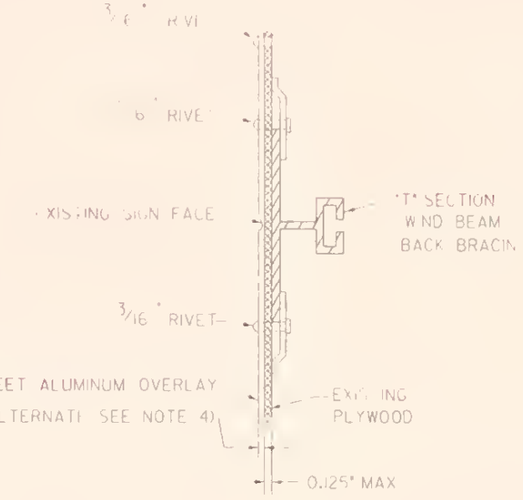
CADD TASG2 IZF2:[040000.1]TAFS10_TAS_2

MONTANA CADD
20-SEP-1991 15:56 TRSG2
ZF2:[040004]TRFSTD.TRS;2

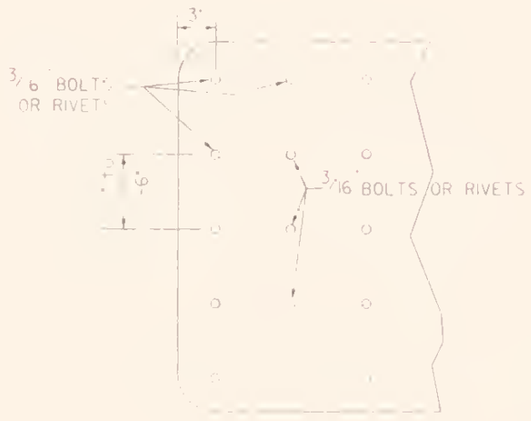
SHEET ALUMINUM OVERLAY

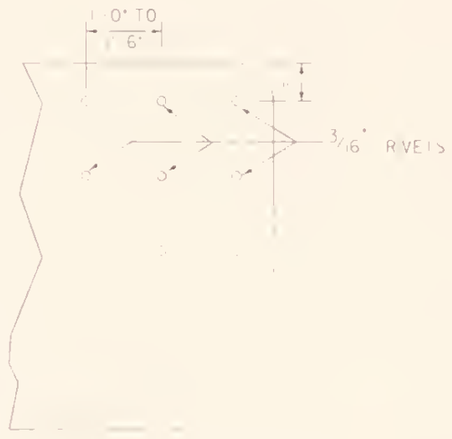


EXISTING PLYWOOD SIGNS



EXISTING ALUMINUM SIGNS





NOTES:

1. All raised letters, numerals, symbols, borders, and previous sign overlays to be replaced shall be removed, and sign face shall be smooth and thoroughly cleaned before overlaying.

2. Letters, numerals, symbols, and borders shall be type "C" cutout unless otherwise specified and shall be applied to the background sheeting prior to field application to the sign.

3. The size of all guide sign overlays and legend must be verified by the Engineer prior to fabrication.

4. Adhesive backed sheeting may be used as an alternate for sign widths of 6'-0" or less if prefabricated to a minimum thickness of 0.005 inches and constructed of preapplied reflective sheeting an adhesive-backed aluminum. Adhesive-backed overlay sheeting shall be applied when air and surface temperature is above 50°F (10°C) This type overlay material may not be used an overhead signs.

5. Reflective sheeting intensity shall, at a minimum, be engineer grade and meet requirements of the Standard Specifications, unless otherwise specified.

6. All materials sha be applied in accordance with the manufactures specifications and recommendations.

7. See Standard Specifications for additional requirements.

8. Aluminum Alloy shall be 6061-T6 or AA5052-H38. All aluminum shall be conversion coated with a process such as Aladine 1200 (or equal), rinsed and dried thoroughly. It shall be protected from soil by acceptable methods.

9. Overlay of signs may require removal from the posts to avoid projecting bolt heads. Warning and regulatory signs to be overlayed shall not be left undisplayed for more than one (1) hour during daylight, and Guide signs shall not be left undisplayed far more than ten (10) hours during daylight. Signs to be overlayed shall be totally operational prior to darkness.

10. Overlays smaller than 4'-0" x 6'-0" shall be overlayed with one pane of material. Seams necessary in large overlays sha have rivets or bolts spaced as shown on this drawing and placed parallel to and no more than 3" laterally from the seam.

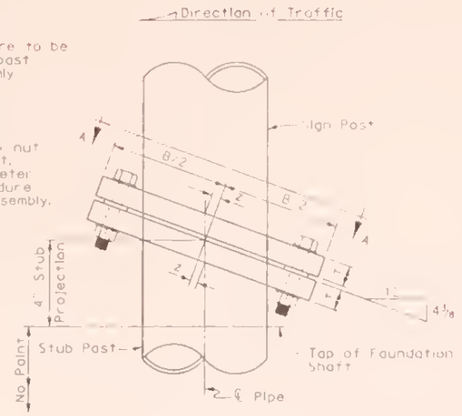
STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG. NO. 619-10
SHEET ALUMINUM OVERLAY	
APPROVED BY ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE	11-1-91

19-SEP-1991 12:46 MTSTD
MONTANA CADD
[601]070001506.1912.DGN;1

NOTE: TUBULAR POSTS are to be used for single post mounted signs only

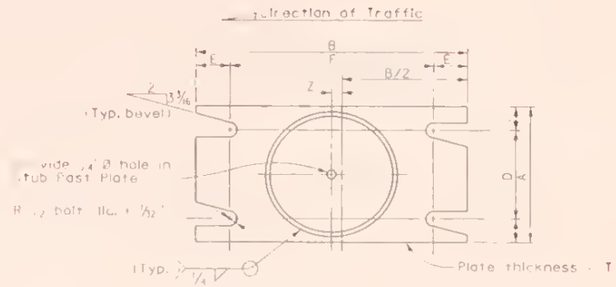
Bolt with hex head, hex nut and 3 washers each bolt. See table for bolt diameter and torque. See procedure for Base Connection Assembly.

NOTE: All bolts shall be ASTM A-325.



ELEVATION

SIGN POST AND STUB POST DETAILS



BASE PLATE DETAIL

SECTION A-A

(See table for Dimensions)

Sections shown are for installation on right shoulder and in gore. Plate slot bevels are opposite hand from that shown for installations on left shoulder.

NOTES

STEEL PIPE: Steel pipe shall conform to the requirements of A.S.T.M. A-53, Type E or S, Grade B or A500, Grade B.

CONCRETE: Concrete shall be Class A or D with wood float finish on top. Form top twelve inches of foundation.

STRUCTURAL STEEL: For requirements governing structural steels and their fabrication, see the Standard Specifications.

APPROVAL: Shop plans shall be approved by the State of Montana, Department of Transportation before fabrication is begun.

SIGNS: For Sign placement and details see Signing Standard Drawings.

GALVANIZED PIPE: Shall be galvanized as per A.S.T.M. A-123

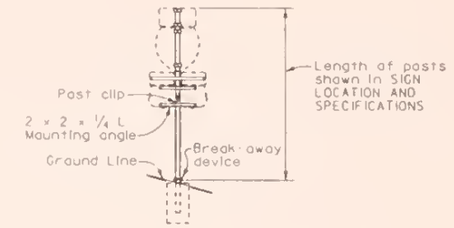
PAINT: Except as otherwise approved by the Engineer, Structural Steel shall receive one (1) shop coat and one (1) coat of red lead or basic lead-silica chromate and one (1) field coat of aluminum paint as specified in the Standard Specifications, on all surfaces not in contact with the concrete.

PROCEDURE FOR BASE CONNECTION ASSEMBLY

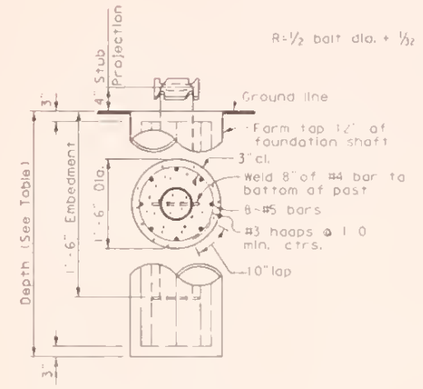
1. Assemble post to stub with bolts and one flat washer between plates.
2. Shim as required to plumb post.
3. Tighten bolts in a systematic order to the prescribed torque. (See Table).
4. Loosen each bolt and retighten to prescribed torque in the same order as original tightening. DO NOT OVERTIGHTEN.
5. Burr threads at junction with nut using a center punch to prevent nut loosening.

NOTE: Frangible bolt breakaway systems approved by FHWA are allowed to be used in place of design shown hereon as an equal option.

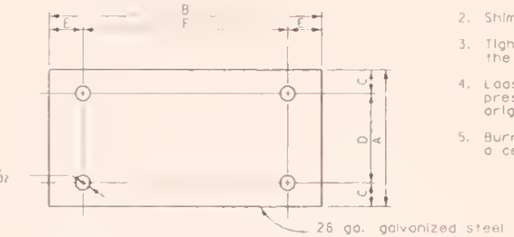
Note: For details of mounting angles see Signing Standard Drawing No. 619-16 and below.


Length of posts shown in SIGN LOCATION AND SPECIFICATIONS
Post clip
2 x 2 x 1/4 L Mounting angle
Ground Line
Break-away device

TYPICAL SIGN ELEVATION



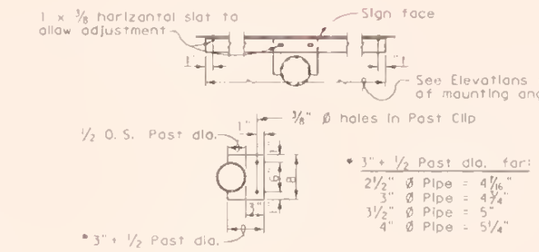
FOUNDATION SHAFT DETAIL



KEEPER PLATE DETAIL

TABLE OF WEIGHTS		
Pipe Size	Nominal weight per foot of pipe	Weight of each break away device and stub post
3"Ø	7.58	28.03
3½"Ø	9.11	35.85
4"Ø	10.79	38.44
5"Ø	14.62	61.51
6"Ø	18.97	81.54

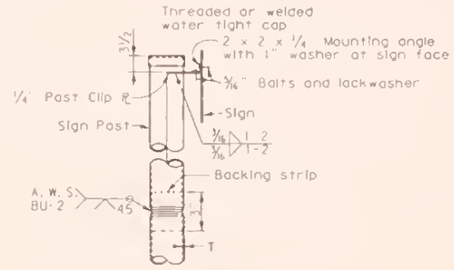
BASE CONNECTION DATA										FOUNDATION	
Nominal Pipe Size	Bolt Size & Torque	A	B	C	D	E	F	T	Z	Footing Diameter	Footing Depth
3"Ø	½"Ø x 2½" Torque=240 ft. lbs.	4½"	7½"	1"	2½"	¾"	6"	¾"	5/16	1-6	3-0
3½"& 4"Ø		5½"	8½"	1"	3½"	¾"	7"	¾"	5/16	1-6	3-0
5"Ø	⅝"Ø x 3¼" Torque=480 ft. lbs.	6½"	9¾"	11¼"	4"	⅛"	8"	1"	⅛	1-6	4-0
6"Ø	¾"Ø x 3½" Torque=780 ft. lbs.	7½"	11¼"	11¼"	5"	1"	9¼"	1"	⅛	1-6	4-6


1 x ⅜ horizontal slot to allow adjustment
Sign face
See Elevations for length of mounting angles.
⅜" Ø holes in Post Clip
½ O.S. Post dia.
* 3" + ½ Post dia.
* 3" + ½ Post dia. for:
2½" Ø Pipe = 4 7/16"
3" Ø Pipe = 4¾"
3½" Ø Pipe = 5"
4" Ø Pipe = 5¼"

POST CLIP DETAILS

Furnish 2-.012" ± thick and 2-.032" ± thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM-B36.

SHIM DETAIL



Note: Backing strip thickness = T or 3/16" max. Splice shall be in top one half of post.

TYPICAL SPLICE

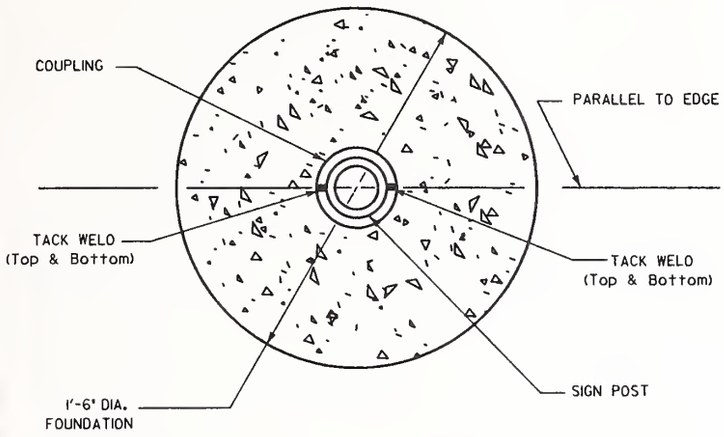
STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 556, 619, 704	DWG. NO. 619-12

TUBULAR SIGN POST DETAILS

APPROVED
BY Thomas J. Bernard
ADMINISTRATOR - HIGHWAY DIVISION

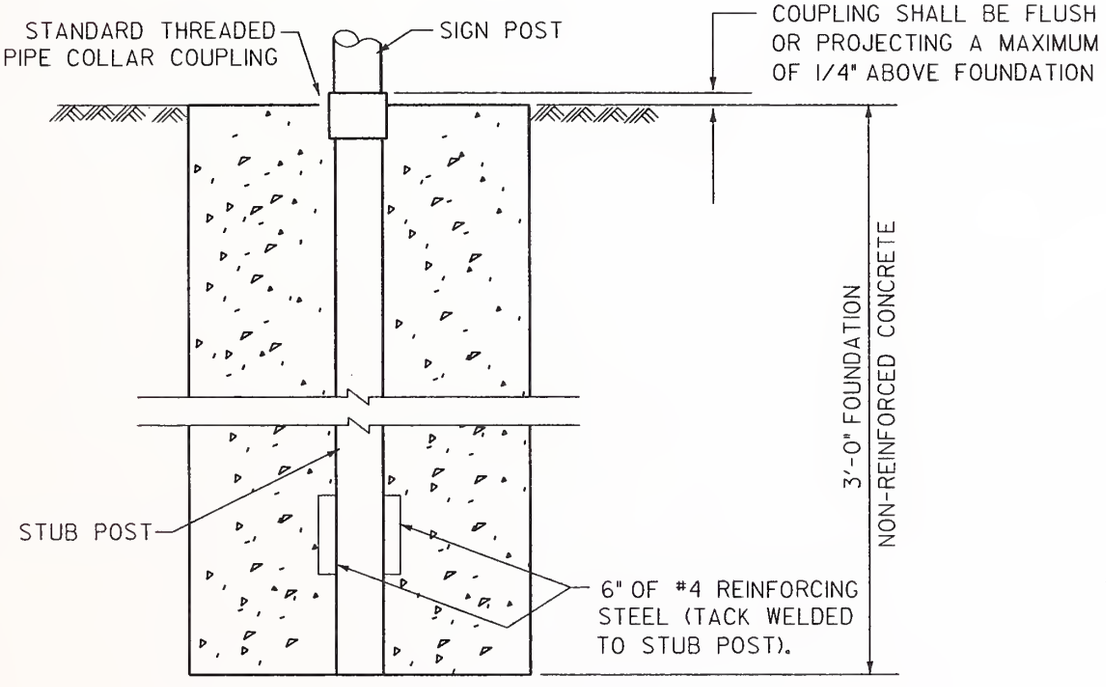
REVISED			
EFFECTIVE	11/1/91		

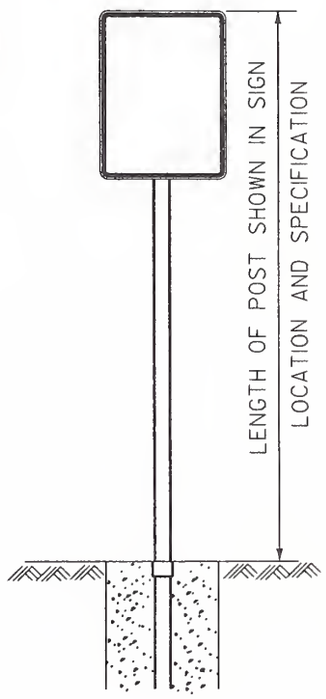
MONTANA CADD
20-SEP-1991 15:56 TRSG2
ZF2:[040004]TRFSTD.TRS;2



TACK WELDS TO BE APROX. 180° APART

PIPE SIZE	NOMINAL WEIGHT PER FOOT OF PIPE	WEIGHT OF EACH BREAKAWAY DEVICE AND STUB POST
2"	3.65	13.07
2½"	5.79	19.94





NOTES:

Concrete shall be Class A or D with wood float finish on top. Form top six (6) inches of foundation.

Steel pipe shall conform to requirements of A-53 Type E or S grade B.

Galvanized pipe shall be galvanized as per A. S. T. M. A-123.

Painted pipe shall receive one (1) shop coat and one (1) field coat of red lead paint or Basic Lead Silico-Chromate and one (1) field coat of aluminum paint, as specified in the Standard Specifications, on all surfaces not in contact with the concrete.

Shop drawings shall be approved by the Montana Department of Transportation before fabrication is begun.

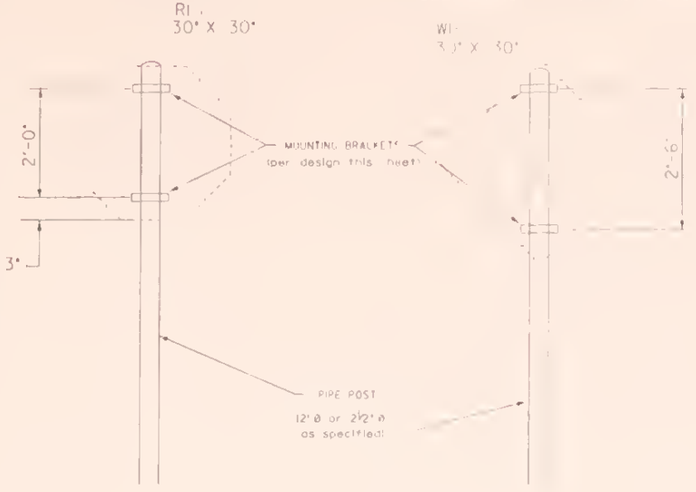
The unit price bid per pound for tubular steel posts shall be full payment for the steel posts and footings in place, including all concrete, welding, excavation, and all incidentals.

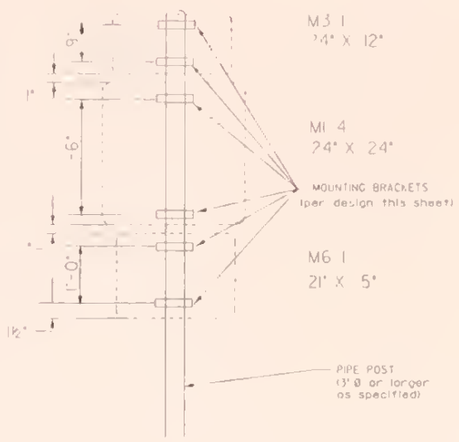
STANDARD DRAWING			
REFERENCE STANDARD SPEC. SECTION 556,619,704		DWG. NO. 619-14	
2" & 2½"Ø PIPE POST BREAKAWAY DETAIL			
APPROVED BY Thomas J. Barnard ADMINISTRATOR-HIGHWAY DIVISION			
REVISED			
EFFECTIVE	11-1-91		

TYPICAL PIPE POST MOUNTING DETAILS

SIGNS WITHOUT BACKBRACING

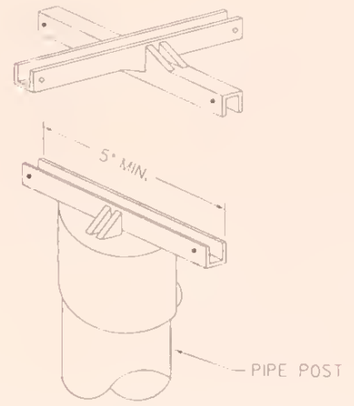
(SEE PLANS FOR BACKBRACING REQUIREMEN





STREET NAME SIGN BRACKET

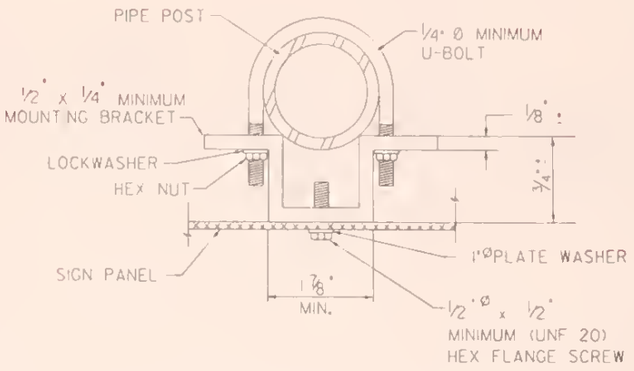
FOR 2" Ø AND 2 ½ " Ø PIPE



SEE FHWA "STANDARD HIGHWAY SIGNS" MANUAL FOR O-3 STREET NAME SIGN TYPICAL LAYOUT. STREET NAME SIGNS SHALL HAVE LEGEND ON BOTH SIDES.

TYPICAL MOUNTING BRACKET DETAILS

FOR 2" Ø AND 2 ½ " Ø PIPE

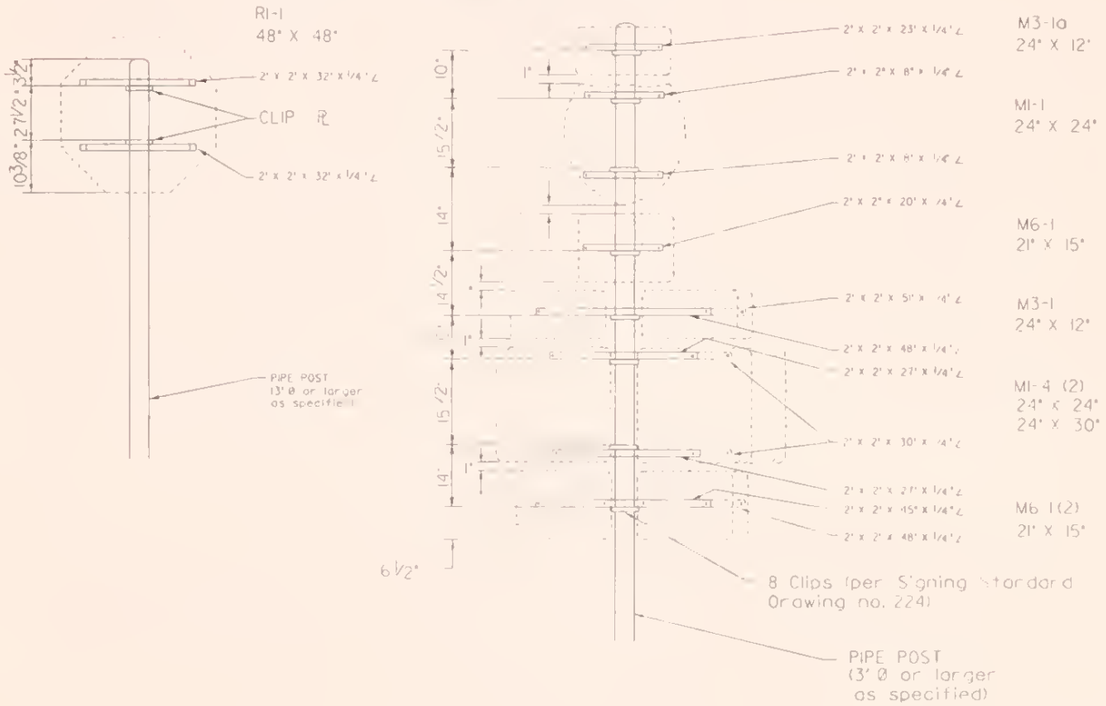


ALL MATERIAL USED IN FABRICATION OF THIS TYPE MOUNTING BRACKET SHALL BE CADMIUM PLATED OR GALVANIZED STEEL.

BACK-TO-BACK SIGN MOUNTING SHALL REQUIRE TWO BRACKETS WITH TWO 2 ½ " X ¼ " CARRIAGE BOLTS IN PLACE OF THE "U" BOLT.

SIGNS WITH BACKBRACING

(SEE PLANS FOR BACKBRACING REQUIREMENTS)


RI-1
48" X 48"
2" x 2" x 32" x ¼" ∠
CLIP R
2" x 2" x 32" x ¼" ∠
10⅜"
12½"
3½"
PIPE POST
(3' Ø or larger
as specified)
10"
15½"
14"
14½"
15½"
14"
6½"
2" x 2" x 23" x ¼" ∠
2" x 2" x 8" x ¼" ∠
2" x 2" x 8" x ¼" ∠
2" x 2" x 20" x ¼" ∠
2" x 2" x 5" x ¼" ∠
2" x 2" x 48" x ¼" ∠
2" x 2" x 27" x ¼" ∠
2" x 2" x 30" x ¼" ∠
2" x 2" x 27" x ¼" ∠
2" x 2" x 15" x ¼" ∠
2" x 2" x 48" x ¼" ∠
8 Clips (per Signing Standard
Drawing no. 224)
PIPE POST
(3' Ø or larger
as specified)

M3-1a
24" X 12"

MI-1
24" X 24"

M6-1
21" X 15"

M3-1
24" X 12"

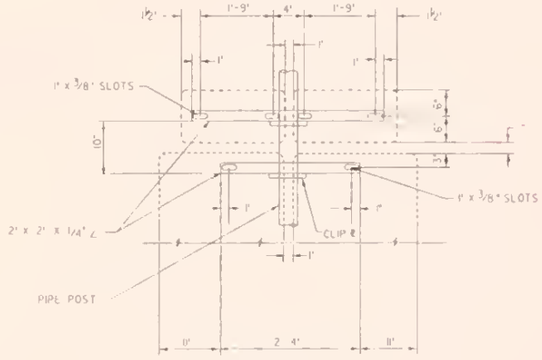
MI-4 (2)
24" X 24"
24" X 30"

M6 1(2)
21" X 15"

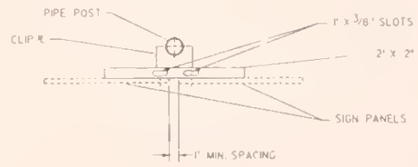
TYPICAL MOUNTING DETAILS

FOR 3" Ø AND LARGER PIPE

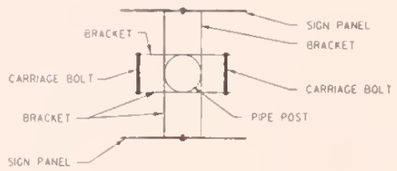
ELEVATION



PLAN VIEW



BACK-TO-BACK MOUNTING



NOTES

VERTICAL DIMENSIONS SHOWN ARE FROM TOP TO TOP OF ALL POST CLIP PLATES AND TO CENTERS OF BRACKETS WHEN CLIP PLATES ARE NOT USED.

A SUITABLE WATERTIGHT CAP SHALL BE PLACED ON TOP OF ALL PIPE POSTS.

2" AND 2-½" Ø PIPE REQUIRE A BREAKAWAY DEVICE AS PER SIGNING STANDARD DRAWING NO. 619-14.

MATERIAL USED IN FABRICATION OF POST CLIPS AND ANGLE BRACKETS SHALL CONFORM TO SECTION 556 OF THE STANDARD SPECIFICATIONS.

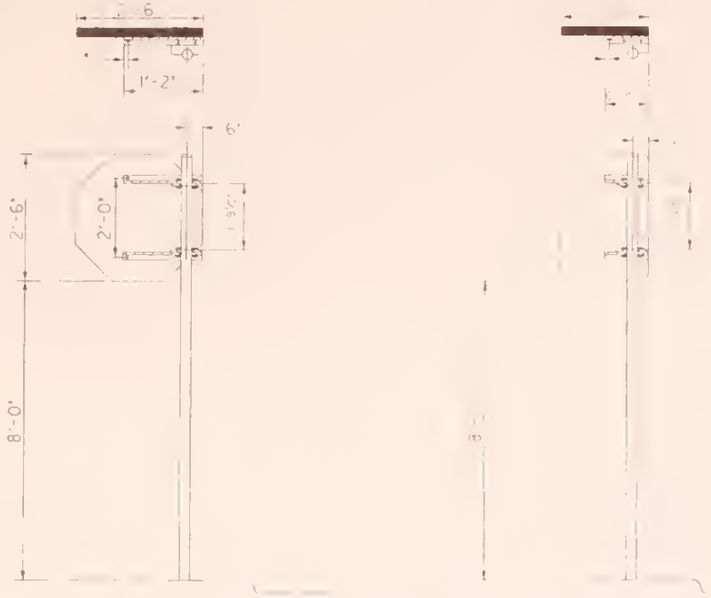
THE LENGTH OF EACH ∠ BRACKET SHALL DEPEND ON THE MOUNTING ASSEMBLY AND HOLE SPACING OF EACH SIGN. THE ASSEMBLIES SHOWN ARE TYPICAL INSTALLATIONS. ALL SIMILAR ASSEMBLIES SHALL BE ERECTED IN A LIKE MANNER.

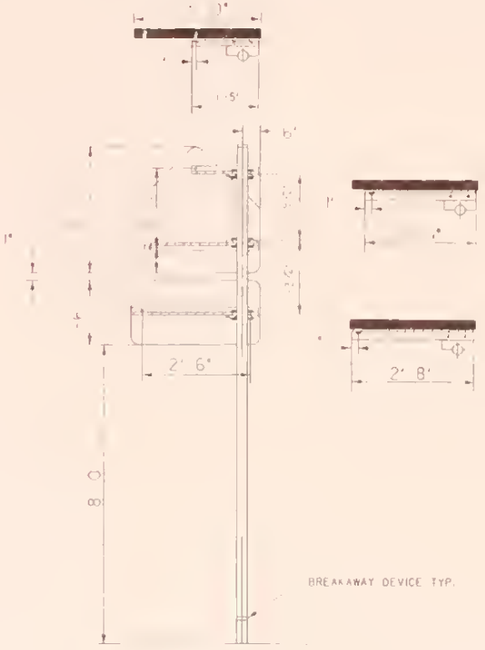
REFER TO FHWA'S MANUAL "STANDARD HIGHWAY SIGNS" FOR STANDARD HOLE SPACING IN SIGNS.

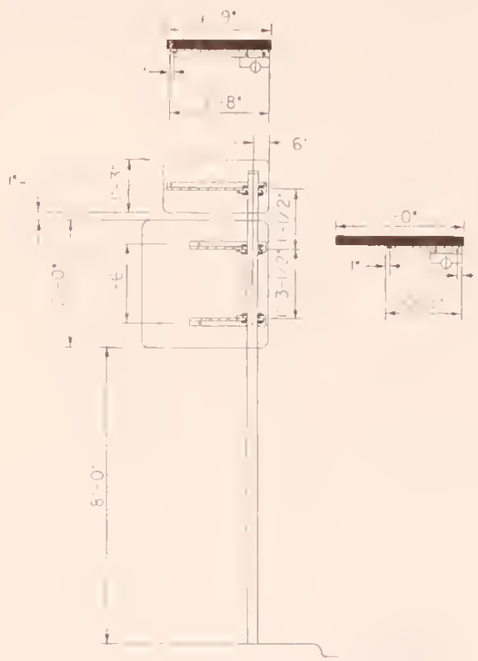
STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 556,619,704	DWG NO. 619-16
TYPICAL PIPE POST MOUNTING DETAILS	
APPROVED BY Thomas J. Bernard ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE 11-1-91	

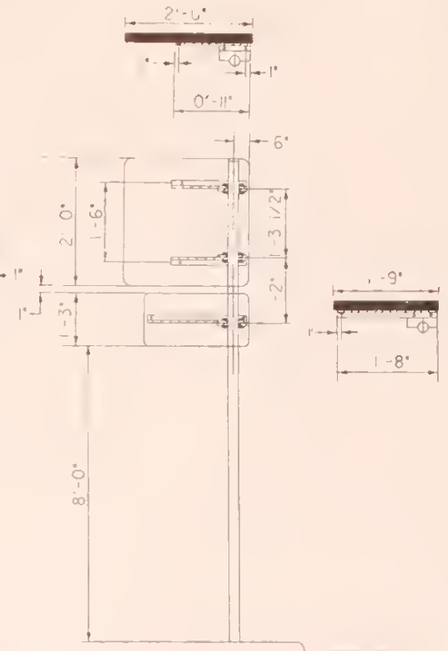
CADD 151ST TRSD2 ZF21E040004 TRFSTD TRS:2

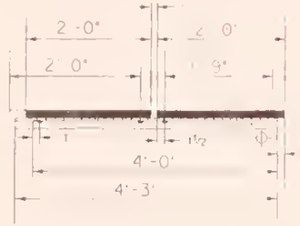
CADD TASG2
ZF2:[040004]TAFT#0.TAS;2



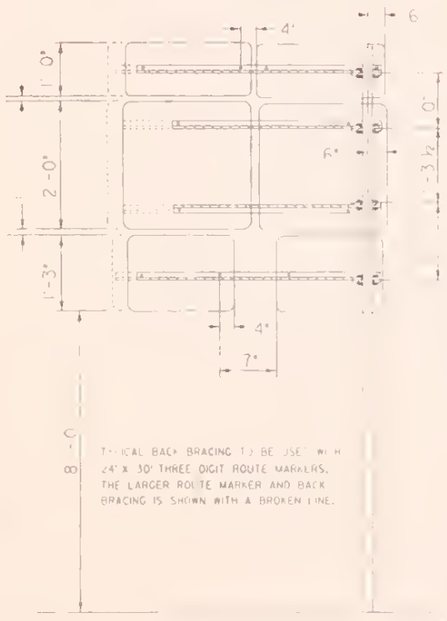




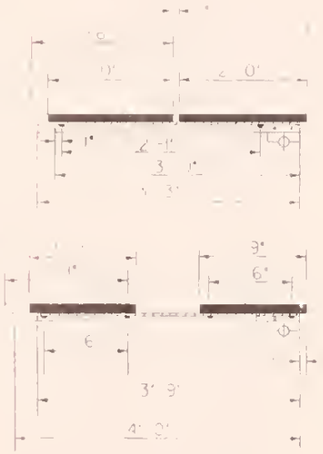


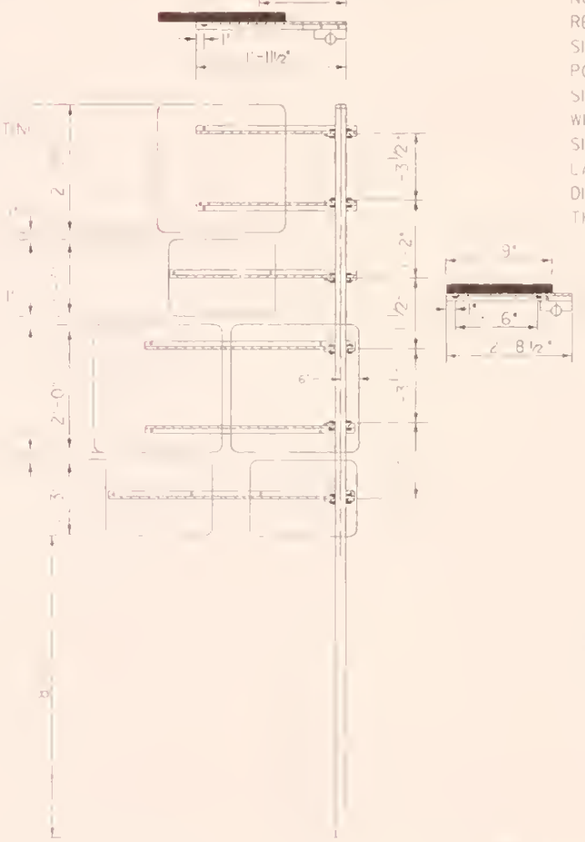


NOTE:
IF AN ALTERNATE MOUNTING IS PROPOSED, IT MUST BE APPROVED BY THE ENGINEER AND THE COST OF ANY ADDITIONAL MATERIAL AND LABOR NECESSARY TO ACCOMPLISH THIS MOUNTING SHALL BE INCLUDED IN THE UNIT PRICE BID FOR TUBULAR STEEL SIGN POSTS.

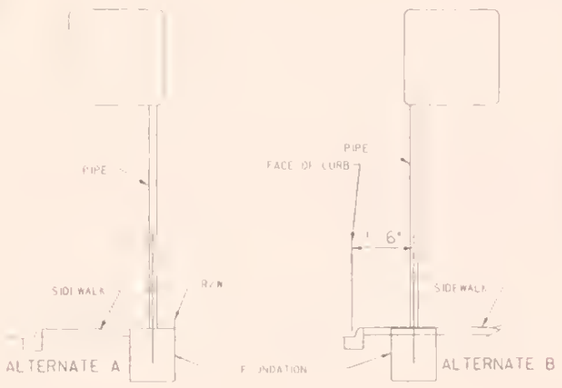


TYPICAL BACK BRACING TO BE USED WITH 24" X 30" THREE DIGIT ROUTE MARKERS. THE LARGER ROUTE MARKER AND BACK BRACING IS SHOWN WITH A BROKEN LINE.

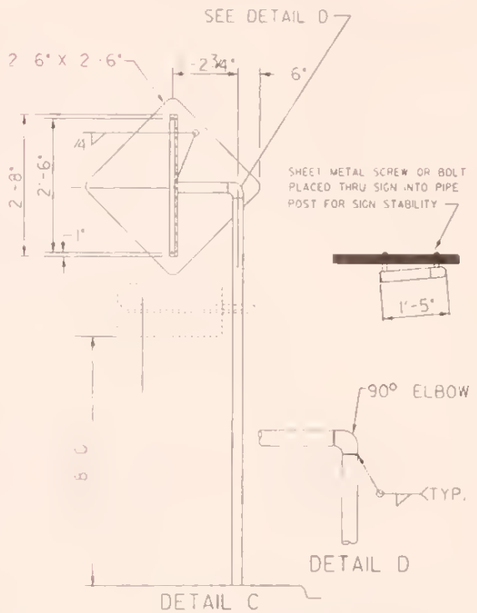




NOTE:
REFER TO FHWA'S MANUAL "STANDARD HIGHWAY SIGNS" FOR STANDARD HOLE SPACING IN SIGNS. POST CLIPS SHALL BE FURNISHED AS DETAILED IN SIGNING STANDARD DRAWING NO. 619-12
WHEN CANTILEVER MOUNTING IS NECESSARY, THE SIZE OF THE POST TO BE USED SHALL BE A SIZE LARGER THAN IS REQUIRED FOR A STANDARD MOUNTING. DIMENSIONS FOR POST CLIP SPACING ARE SHOWN TO THE TOP OF EACH CLIP.



THE STANDARD TYPE I MOUNTING SHOULD BE USED BEHIND SIDEWALKS IF R/W LIMITS PERMIT. IF R/W DOESN'T PERMIT THEN ALTERNATE A SHOULD BE USED BEHIND SIDEWALKS OR IN THE SIDEWALK NEXT TO BUILDING. IF CONDITIONS ARE SUCH THAT THE SIGN CANNOT BE MOUNTED ON THE BACKSIDE OF THE SIDEWALK THEN ALTERNATE B SHOULD BE USED.



STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 556,619,704	DWG. NO. 619-18
CANTILEVER TYPE SIGN SUPPORT DETAILS FOR SIDEWALK AREAS	
APPROVED BY Thomas McDonald, ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE 11-1-91	

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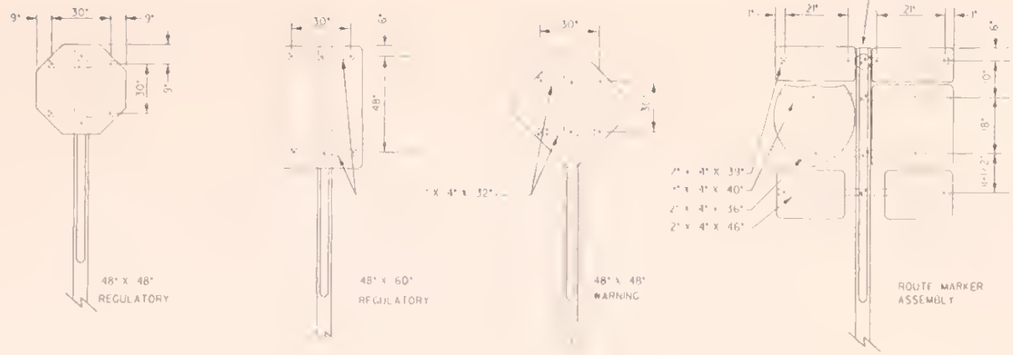
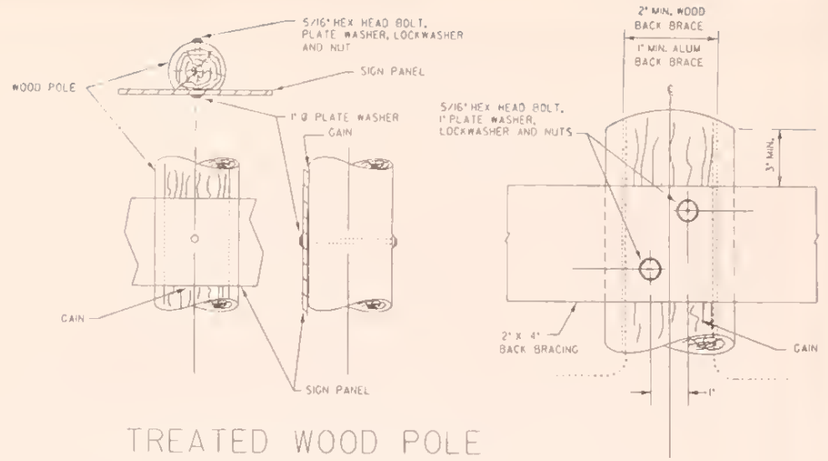
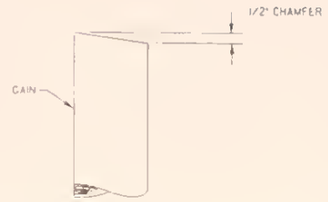


TYPICAL SIGN MOUNTINGS

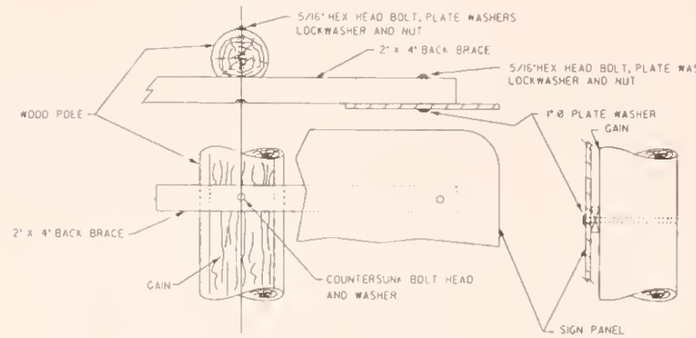


TREATED WOOD POLE
W/O BACK BRACING

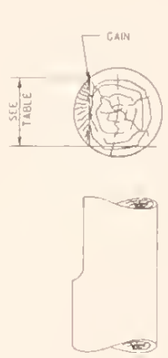
DETAIL A



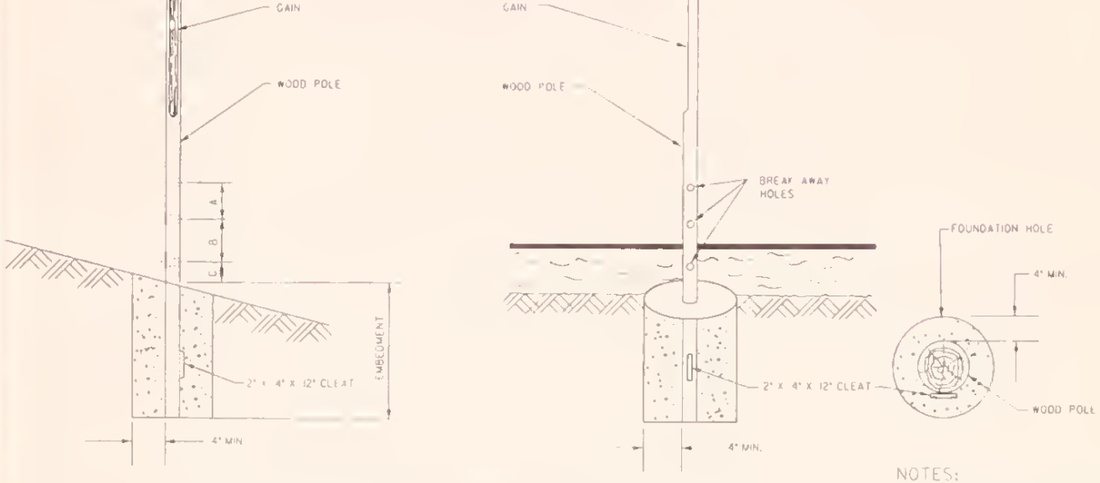
TOP END TREATMENT


5/16" HEX HEAD BOLT, PLATE WASHERS LOCKWASHER AND NUT
2" x 4" BACK BRACE
5/16" HEX HEAD BOLT, PLATE WASHER, LOCKWASHER AND NUT
WOOD POLE
1" Ø PLATE WASHER
GAIN
2" x 4" BACK BRACE
GAIN
COUNTERSUNK BOLT HEAD AND WASHER
SIGN PANEL

TREATED WOOD POLE
WITH BACK BRACING



GAIN DETAIL



BREAK-AWAY AND FOOTING DETAILS

POLE SIZE	A	B	C	*HOLE DIA.	EMBEDMENT	GAIN
3" TOP Ø	—	—	—	—	3'-0"	2-3/4"
4" TOP Ø	—	—	—	—	3'-0"	3-1/2"
5" TOP Ø	—	12"	4"	2"	3'-6"	4"
6" TOP Ø	—	12"	4"	2"	4'-6"	4"
CLASS 4	—	12"	4"	2"	5'-0"	4"
CLASS 3	—	12"	4"	2-1/2"	5'-6"	4"
CLASS 2	6"	6"	4"	2"	6'-0"	4"
CLASS 1	6"	6"	4"	2-1/2"	6'-6"	4"

NOTES:

1. ALL TIMBER POLES SHALL CONFORM TO THE CURRENT STATE OF MONTANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS SECTION 704.
2. ALL POLES SHALL BE GAINED ON THE SIGN SIDE A MINIMUM AS SHOWN IN THE TABLE BELOW FOR ½ THE LENGTH OF EACH POLE AS SHOWN.
3. BREAKAWAY DETAILS SHALL BE STANDARD FOR ALL TIMBER WOOD POLES LISTED IN THE TABLE BELOW, EITHER ON SINGLE OR MULTIPLE SIGN SUPPORTS.
4. ALL BACK BRACING MATERIAL SHALL BE 2"X4" S 4 S LUMBER, AND SHALL MEET ALL SPECS LISTED IN SECTION 704 OF THE STANDARD SPECIFICATIONS.
5. ALL BOLTS, NUTS, AND WASHERS SHALL BE OF ALUMINUM, STAINLESS STEEL, OR CADMIUM PLATED STEEL MATERIAL.
6. A 2" X 4" X 12" BOARD SHALL BE ATTACHED 12" FROM THE BOTTOM OF THE POLE. ATTACHMENT SHALL BE MADE BY DRIVING TWO NAILS (6d) THROUGH THE 2" X 4" AND INTO THE POLE. THE 2" X 4" SHALL BE TREATED ACCORDING TO THE STANDARD SPECIFICATIONS. THE COST FOR ALL MATERIAL AND LABOR TO ACCOMPLISH THIS WORK SHALL BE INCLUDED IN THE ITEM - POLES TREATED TIMBER BARN OF THE CONTRACT.
- 7. MAXIMUM CROSS SECTIONAL AREA AT A POINT 4' ABOVE GROUND LEVEL SHALL NOT EXCEED 24 SQUARE INCHES EXCLUSIVE OF DRILLED BREAKAWAY HOLES FOR UNPROTECTED POST INSTALLATIONS. HOLE DIAMETER MAY BE ENLARGED IF NECESSARY TO INSURE THIS REQUIREMENT IS MET.

STANDARD DRAWING

REFERENCE STANDARD SPEC. SECTION 619,704

DWG. NO. 619-20

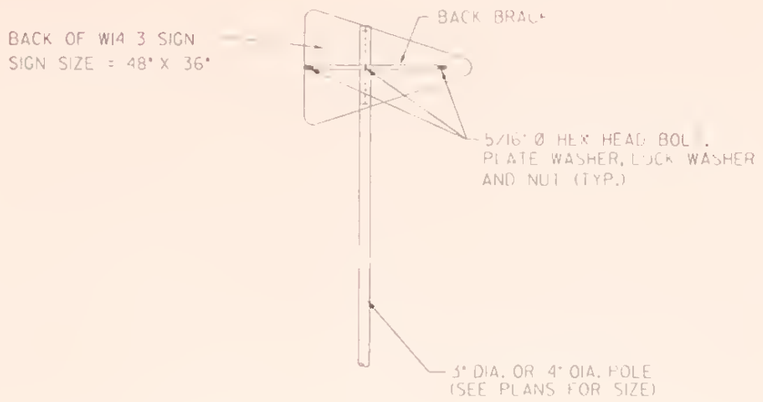
TREATED TIMBER POLE SIGN SUPPORT DETAILS

APPROVED BY Thomas J. Bernard
ADMINISTRATOR-HIGHWAY DIVISION

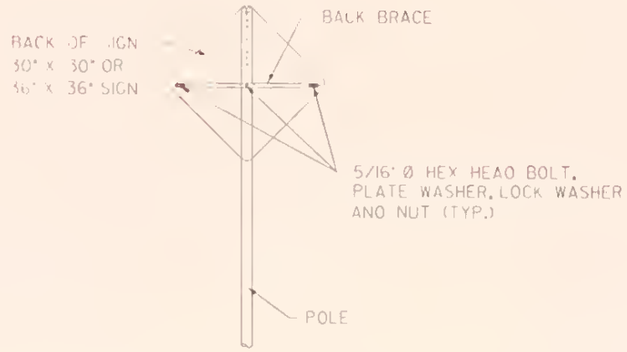
REVISED			
EFFECTIVE	11-1-91		

BACK BRACE INSTALLATION

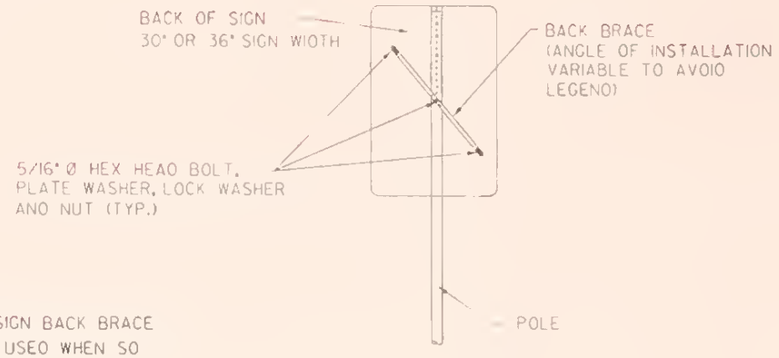
NO PASSING PENNANTS


BACK OF W14-3 SIGN
SIGN SIZE = 48" X 36"
BACK BRACE
5/16" Ø HEX HEAD BOLT, PLATE WASHER, LOCK WASHER AND NUT (TYP.)
3" DIA. OR 4" DIA. POLE (SEE PLANS FOR SIZE)

WARNING SIGNS



REGULATORY SIGNS

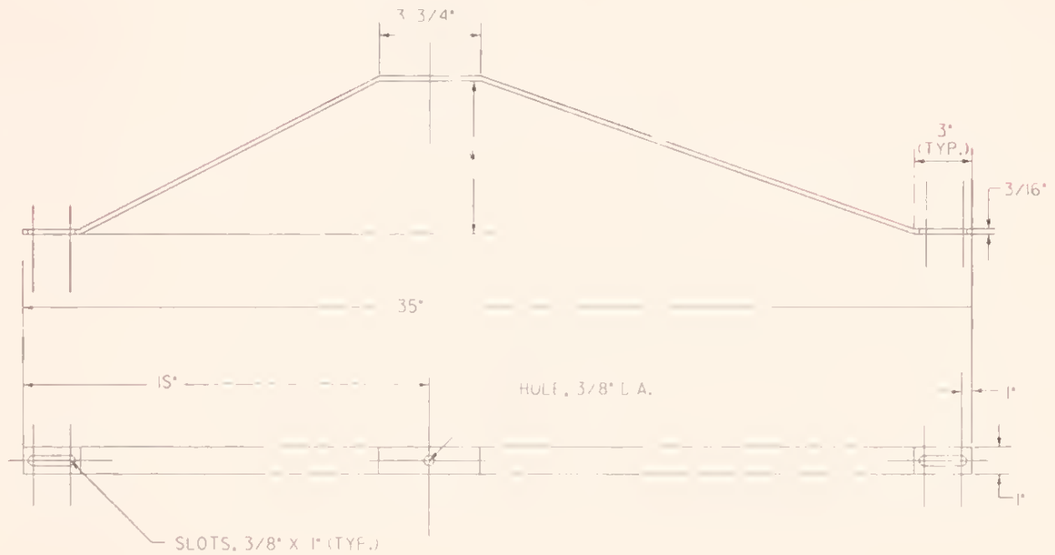

BACK OF SIGN
30" OR 36" SIGN WIOTH
BACK BRACE (ANGLE OF INSTALLATION VARIABLE TO AVOIO LEGENO)
5/16" Ø HEX HEAD BOLT, PLATE WASHER, LOCK WASHER AND NUT (TYP.)
POLE

NOTE

THIS OESIGN BACK BRACE MAY BE USEO WHEN SO SPECIFIEO ON SIGNING PLANS

BACK BRACE DETAIL

NO PASSING PENNANTS



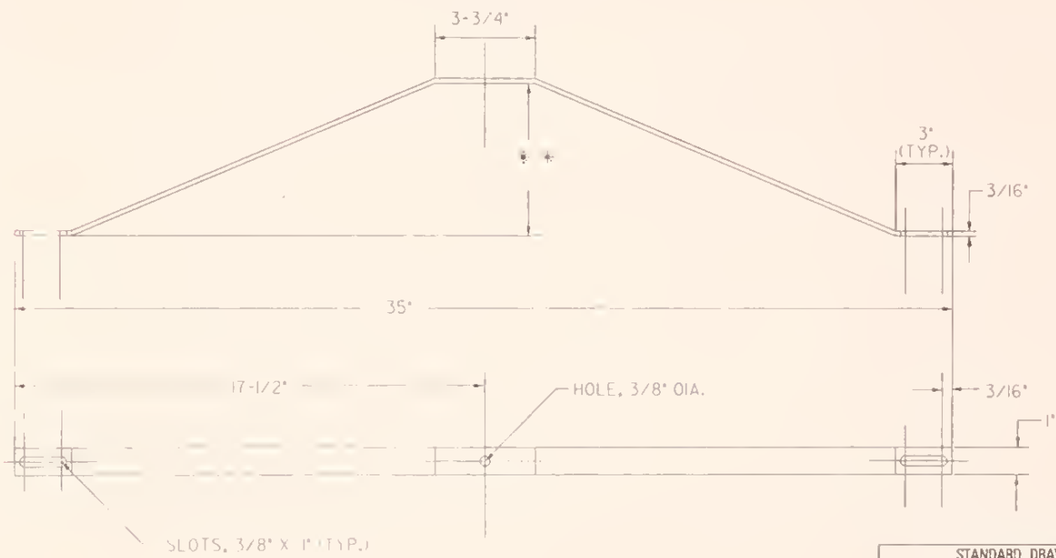
3" Ø POLE = 2-1/8"
4" Ø POLE = 3"

NOTE

MATERIAL SHALL BE COMMERCIAL QUALITY, MILO STEEL, HOT-OIP GALVANIZEO AFTER FABRICATION. GALVANIZING SHALL CONFORM TO THE SPECIFICATIONS OF A. S. T. M. OESIGNATION : A123

BACK BRACE DETAIL

REGULATORY & WARNING SIGNS



3" Ø POLE = 2-1/8"
4" Ø POLE = 3"
5" Ø POLE = 4"
6" Ø POLE = 5-1/4"

STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG NO. 619-22

OPTIONAL
BACK BRACING FOR SIGNS

APPROVED BY
ADMINISTRATOR-HIGHWAY DIVISION

REVISED			
EFFECTIVE	11-1-91		

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CHEVRON MOUNTING DETAILS

20-SEP-1991
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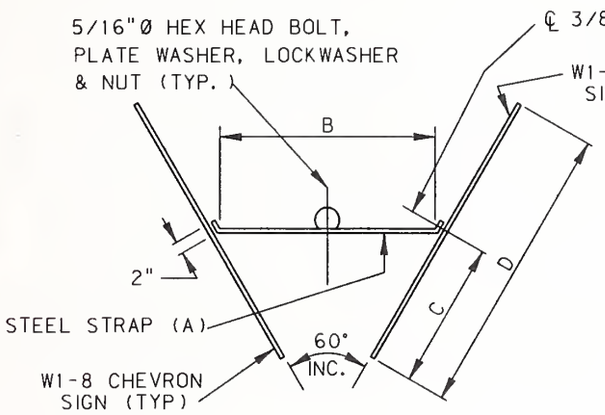
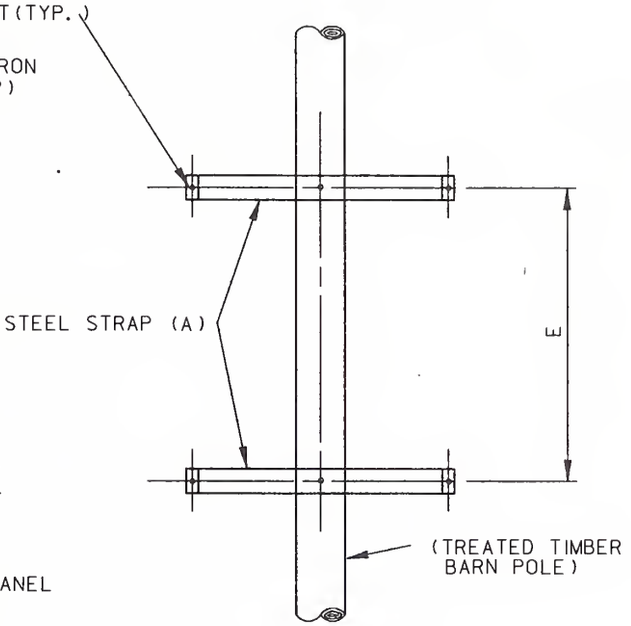
PLAN VIEW



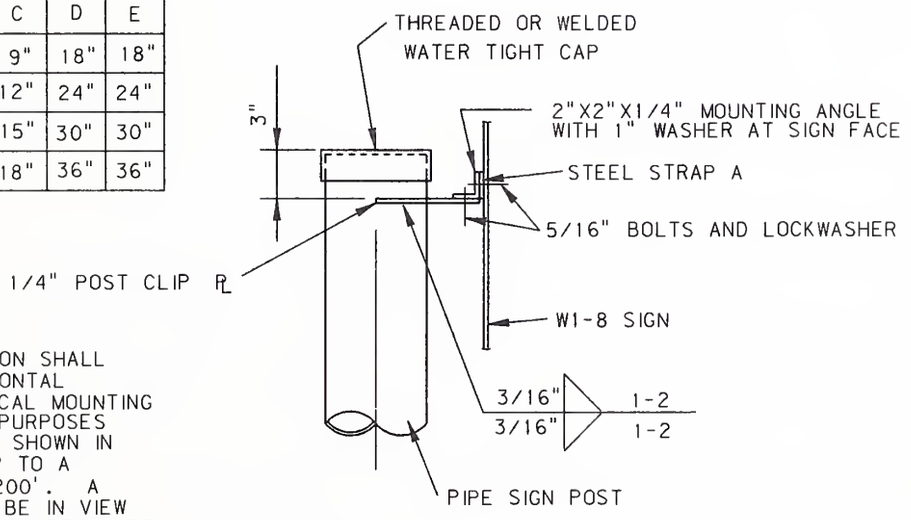
ELEVATION



WOOD POST

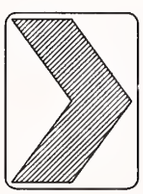
MOUNT 2 CHEVRON SIGNS ON EACH POST WITH EACH PANEL ADJUSTED TO APPROXIMATE RIGHT ANGLE TO ROADWAY CENTERLINE. EXACT LOCATION AND ANGLE TO BE DETERMINED BY ENGINEER.

SIGN SIZE	DIMENSIONS				
	A	B	C	D	E
18"X24"	1/4"X2"X1'-7"	15"	9"	18"	18"
24"X30"	1/4"X2"X1'-10"	18"	12"	24"	24"
30"X36"	1/4"X2"X2'-1"	21"	15"	30"	30"
36"X48"	1/4"X2"X2'-4"	24"	18"	36"	36"



STEEL PIPE

DESIGN INSTALLATION OF CHEVRON SHALL BE AT A MINIMUM 10'-0" HORIZONTAL CLEARANCE AND A 5'-0" VERTICAL MOUNTING HEIGHT. SPACING FOR DESIGN PURPOSES SHALL BE DOUBLE THE SPACING SHOWN IN TABLE 1, STD DWG 619-36; UP TO A MAXIMUM CHEVRON SPACING OF 200'. A MINIMUM OF 3 CHEVRONS SHALL BE IN VIEW THROUGH THE CURVE. CHEVRONS ARE TO BE FIELD INSPECTED AT NIGHT AND LOCATION ADJUSTED TO ACHIEVE 500' OF VISIBILITY AND FINAL LOCATION.



W1-8 CHEVRON ALIGNMENT SIGNS MAY BE USED AS AN ALTERNATE OR AS A SUPPLEMENT TO DELINEATION PROVIDING ADDITIONAL EMPHASIS AND GUIDANCE WHEN A CHANGE IN HORIZONTAL ALIGNMENT EXISTS IN THE ROADWAY.

STANDARD DRAWING			
REFERENCE STANDARD SPEC. SECTION 619		DWG. NO. 619-24	
CHEVRON MOUNTING DETAILS			
APPROVED BY Thomas J. Barnard ADMINISTRATOR-HIGHWAY DIVISION			
REVISED			
EFFECTIVE	11-1-91		

20-SEP-1991
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PANELS

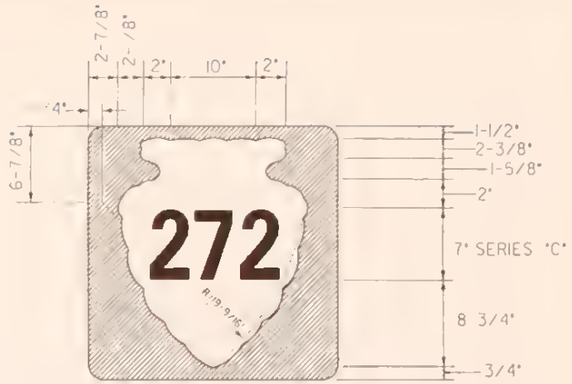
FOR ROUTE MARKER ASSEMBLY USE

M1–5
PRIMARY

M 1 - 5
24" X 24"
MARGIN = NONE
BOROER = 1-1/2"
CORNER RADIUS = 1-1/2"
BLACK LEGEND AND BORDER ON A REFLECTORIZED WHITE BACKGROUND.

M 1 - 5
30" X 24"
MARGIN = NONE
BORDER = 1 1/2"
CORNER RADIUS = 1-1/2"
BLACK LEGEND AND BORDER ON A REFLECTORIZED WHITE BACKGROUND.

M1–10
SECONDARY



M 1 10
24" X 24"
MARGIN = NONE
BOROER = SEE OESIGN ABOVE.
CORNER RADIUS = 1-1/2"
BLACK LEGEND ANO BOROER ON A REFLECTORIZED WHITE BACKGROUND.

SHIELDS

FOR USE ON GUIDE SIGNS

PRIMARY

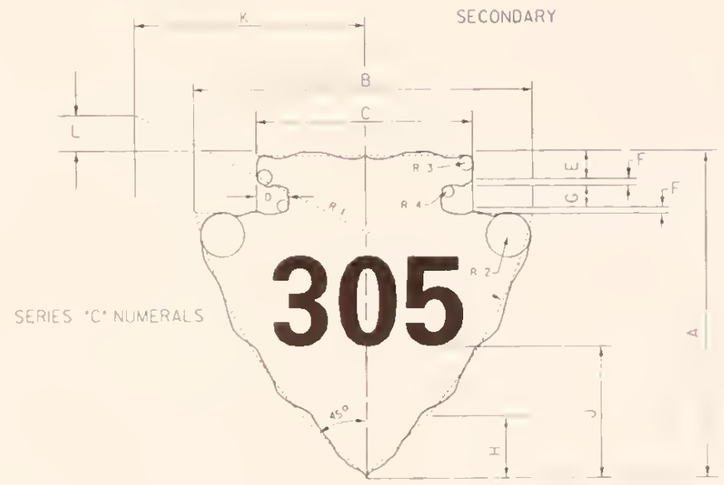
SERIES "D" NUMERALS

	10" NUM		12" NUM		18" NUM	
	2 DIGIT	3 DIGIT	2 DIGIT	3 DIGIT	2 DIGIT	3 DIGIT
A	21"	21"	24"	24"	36"	36"
B	24"	30"	24"	30"	36"	45"
J	6"	6"	6-1/2"	6-1/2"	9-1/2"	9-1/2"
R	1-1/2"	1-1/2"	2"	2"	2-1/2"	2-1/2"

BLACK LEGEND ON A REFLECTORIZED WHITE BACKGROUND WITH NO BOROER.

SECONDARY

SERIES "C" NUMERALS



NUMERAL SIZE	A	B	C	D	E	F	G	H	J	K	L	RADIUS R	R 2	R 3	R 4
8" *2"	26"	28"	18-1/2"	2 5/8"	3"	5/16"	2"	5-1/2"	11"	17"	2-1/4"	32"	1-3/4"	5/8"	5/16"
* *	32"	34"	22-1/2"	3	4"	3 5. 8"	3/8"	2-1/2"	6-3/4"	13-3/4"	20-1/2"	2"	38-1/2"	2"	3/4"	3/8"
* * *	40"	42"	28"	4"	4-1/2"	1/2"	3"	8-7/16"	17"	25"	2-7/8"	48"	2-1/2"	1"	1/2"

BLACK LEGEND ON A REFLECTORIZED WHITE BACKGROUND.
* TO BE USED WITH STANDARD 4" U.S. SHIELD.
* * TO BE USED WITH STANDARD 30" & 36" U.S. SHIELD.
* * * TO BE USED WITH STANDARD 42" U.S. SHIELD & ALL INDEPENDENT USE.

NOTES:

ALL NUMERALS USED ON PANELS AND SHIELDS SHALL BE OPTICALLY CENTERED ABOUT VERTICAL CENTERLINE.

SEE SIGNS AND SIGNING MATERIALS CATALOG FOR COMPLETE LISTING OF SIGNS AND SIGN SIZES. OESIGNS ARE AVAILABLE FROM THE TRAFFIC UNIT FOR SIGNS UNIOUE TO MONTANA.

STANDARD DRAWING

REFERENCE STANDARD SPEC. SECTION 619

DWG NO. 619-26

SPECIAL DESIGN PRIMARY & SECONDARY ROUTE MARKER PANELS AND SHIELDS

APPROVED BY Norman H. Bernard
ADMINISTRATOR-HIGHWAY DIVISION

REVISED
EFFECTIVE 11-1-91

MONTANA CADD
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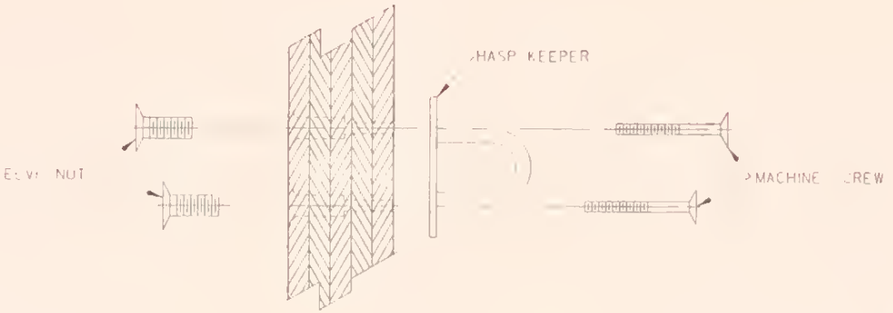
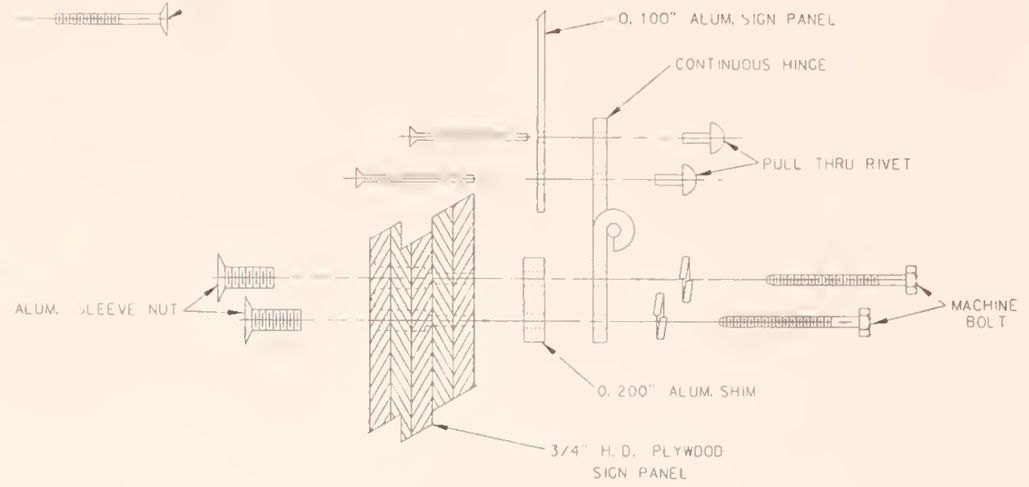
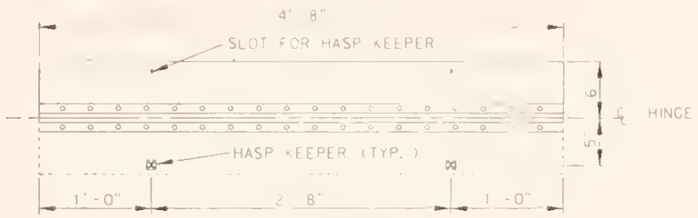


PLYWOOD MOUNTING

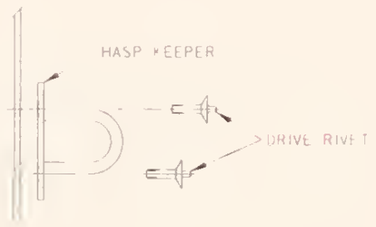




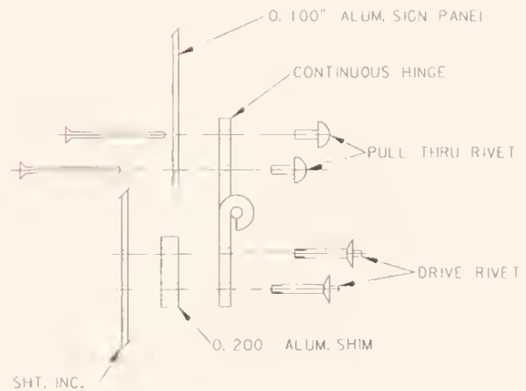
HINGE DETAIL

EXAMPLE

(5'-6" X 4'-0" D8-2A WEIGH STATION SIGN SHOWN)



ALUMINUM SHEET MOUNTING



NOTES:

1. SEE SIGNS AND SIGNING MATERIALS CATALOG FOR COMPLETE LISTING OF SIGNS AND SIGN SIZES. DESIGNS ARE AVAILABLE FROM THE TRAFFIC UNIT FOR SIGNS UNIQUE TO MONTANA.

2. THE SIGN PANEL SHALL BE 3/4" HIGH DENSITY PLYWOOD OR .125" ALUMINUM SHEET INCREMENT AS SPECIFIED ON THE PLANS. THE HINGED PANEL SHALL BE 0.100" SHEET ALUMINUM.

3. ALL HARDWARE VISIBLE ON THE SIGN FACE SHALL BE PAINTED OR COVERED WITH REFLECTIVE SHEETING THE SAME COLOR AS THE SIGN.

4. SHOP DRAWINGS SHALL BE SUBMITTED AND APPROVED PRIOR TO FABRICATION.

5. SUPPLEMENTAL SIGN PANEL BELOW MAJOR SIGN PANEL SHALL HAVE REFLECTORIZED LEGEND AND BACKGROUND MATCHING COLORS OF MAJOR PANEL.

6. THE MOUNTING HEIGHT TO THE BOTTOM OF THE SECONDARY PANEL SHALL BE A MINIMUM OF 5'-0".

STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619,704	DWG. NO. 619-30
SIGN HINGE DETAILS	
APPROVED BY ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE	11-1-91

23-SEP-1991
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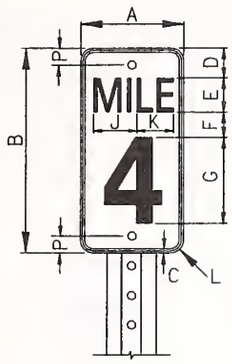
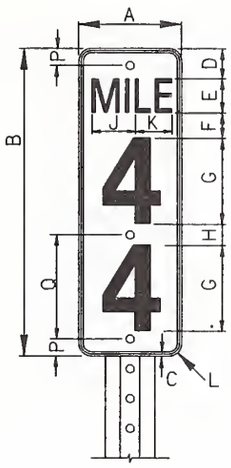
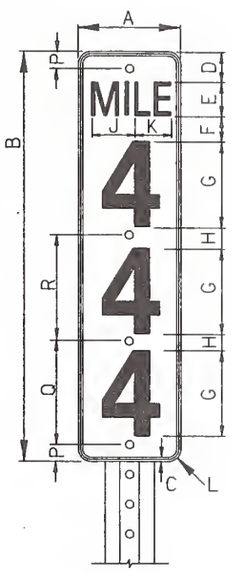
&
D10-4



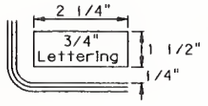
D10-2
&
D10-5



D10-3
&
D10-6



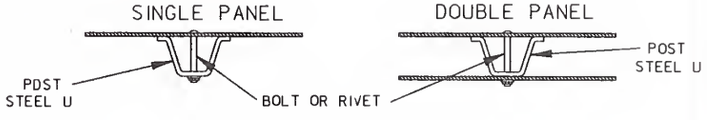
P001	PRIMARY
S201	SECONDARY
I015	INTERSTATE



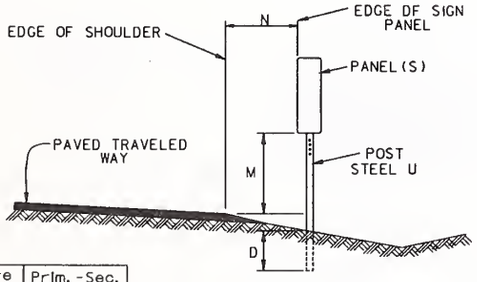
ROUTE IDENTIFICATION STICKERS

NOTES

1. IN CASE OF A NEW SIGNING PRDJECT THE CDNTRACTOR SHALL FURNISH AND PLACE RDUTE NUMBER IDENTIFICATIDN STICKERS UPDN BACKS DF ALL SIGNS BEFDRE FINAL ACCEPTANCE OF THE PROJECT. THE COST FDR THE LABOR TO ACCOMPLISH THIS WORK SHALL BE INCLUDED IN THE SHEET ALUMINUM AND DR ALUMINUM SHEET INCREMENT ITEMS OF THE CDNTRACT.
2. THE STICKER SHALL DISPLAY THE FEDERAL AID ROUTE NUMBER AND SHALL BE PLACED IN THE LOWER LEFT CORNER DF THE MILEPDST SIGN, NEAREST THE EDGE OF RDADWAY.



TYPICAL MILEPOST PANEL MOUNTING



	Interstate	Prim.-Sec.
M	4'	4'
N	6'	✳2' to 6'
D	2' Min.	2' Min.

✳NORMALLY IN LINE WITH DELINEATORS

TYPICAL MILEPOST PLACEMENT

NOTES

1. MILEPDST PANEL SHALL HAVE A REFLECTDRIZED WHITE LEGEND AND BDRDER DN REFLECTORIZED GREEN BACKGRDUND.
2. ALL MILEPOSTS SHALL BE MDUNTED DN A 2 LB./FT. MINIMUM STEEL U PDST EXCEPT THE D10-6 SHALLSHALL BE MDUNTED DN A 3 LB./FT. MINIMUM STEEL U POST AS NOTED IN THE SIGNING PLANS.
3. 5/16" BOLT, NUT AND WASHER SHALL BE GALVANIZED OR CADMIUM PLATED. THREADS SHALL BE JAMMED AFTER TIGHTENING. RIVETS SHALL BE 5/16" ALUMINUM OR CADMIUM PLATED. BOLT OR RIVET HEADS SHALL BE PAINTED WITH BRILLIANT GREEN SIGN ENAMEL.
4. A MILEPDST SHALL NOT BE RELOCATED OR MOVED ONCE IT HAS BEEN PROPERLY PLACED.

MILEPOST PANEL DIMENSION INFORMATION

INT'ST.	D10-4	D10-5	D10-6
KEY	1-DIGIT	2-DIGIT	3-DIGIT
A	12.0	12.0	12.0
B	24.0	36.0	48.0
C	0.5	0.5	0.5
D	3.5	3.0	3.0
E	4C	4C	4C
F	3.0	3.0	3.0
G ✳	10C	10C	10C
H	-	3.0	2.5
J	4.6	4.6	4.6
K	4.8	4.8	4.8
L	1.5R	1.5R	1.5R
P	2.0	2.0	2.0
Q	-	13.0	12.0
R	-	-	13.0

PRI/SEC	D10-1	D10-2	D10-3
KEY	1-DIGIT	2-DIGIT	3-DIGIT
A	10.0	10.0	10.0
B	18.0	27.0	36.0
C	0.5	0.5	0.5
D	2.0	2.0	2.0
E	4B	4B	4B
F	2.0	2.0	2.0
G ✳	6C	6C	6C
H	-	3.0	3.0
J	3.6	3.6	3.6
K	3.8	3.8	3.8
L	1.5R	1.5R	1.5R
P	1.5	1.5	1.5
Q	-	10.0	10.0
R	-	-	9.0

✳DIGITS SHOULD BE OPTICALLY CENTERED ON VERTICAL ℄ MILEPOST PANEL.
ABOVE VALUES ARE IN INCHES.

STANDARD DRAWING

REFERENCE STANDARD SPEC. SECTION 619

DWG. NO. 619-32

MILEPOST DETAILS

APPROVED
BY Thomas J. Barnard
ADMINISTRATOR-HIGHWAY DIVISION

REVISED			
EFFECTIVE	11-1-91		

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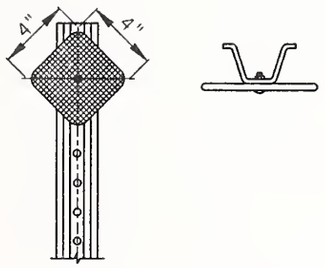
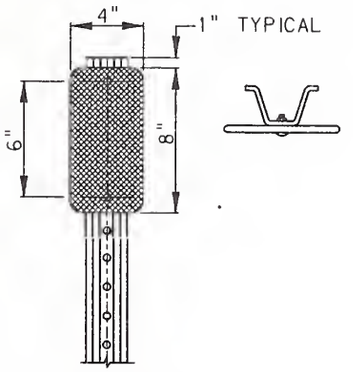
USE A FOR CONTINUOUS DELINEATION AND RT. SHOULDER OF PRIMARY, SECONDARY AND INTERSTATE ROUTES. USE H FOR LT. SHOULDER OF INTERSTATE ROUTES.



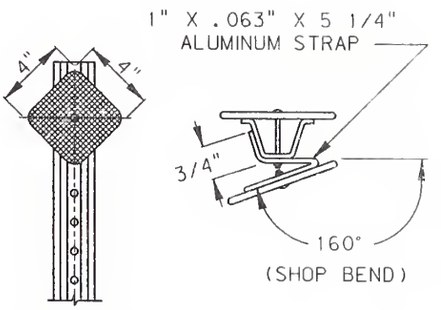
DESIGN A (WHITE)
DESIGN H (YELLOW)

J-TRUCK ESCAPE RAMPS ONLY. G USED AT RT. SHOULDER OF INTERSTATE RAMPS.



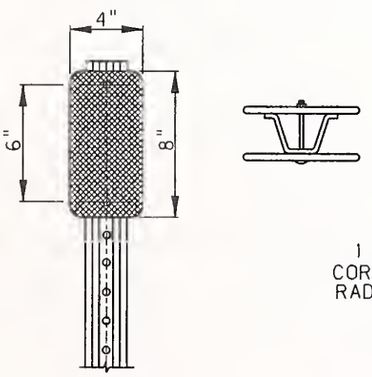
DESIGN B (YELLOW)
DESIGN G (WHITE)
DESIGN J (RED)

CURVES 10° AND OVER BOTH OUTSIDE AND INSIDE OF CURVE.



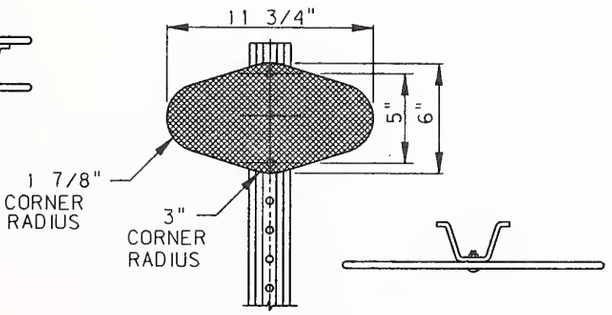
DESIGN C (WHITE)

PRIMARY, SECONDARY ROUTES AT APPROACHES WITH STOP OR YIELD SIGNS. INTERSTATE ROUTES- RAMP TERMINATION AT CROSSROAD.



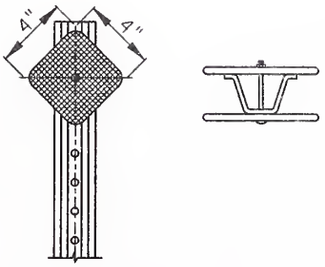
DESIGN D (YELLOW)

SPECIAL USE-RARELY USED. FORMER USE AT GORES, ISLAND NOSES.



DESIGN E (YELLOW)

CURVES LESS THAN 10°
4° TO 7°29' OUTSIDE ONLY
7°30' TO 10° OUTSIDE AND INSIDE.



DESIGN F (WHITE)

DELINEATOR LEGEND	
DESIGN "A"	⊣
DESIGN "B"	⊣|
DESIGN "C"	⊢⊣
DESIGN "D"	|⊢⊣|
DESIGN "E"	⊣|||
DESIGN "F"	⊢
DESIGN "G"	⊣<
DESIGN "H"	⊣>
DESIGN "J"	⊣×

NOTE: SOME TYPICAL USES ARE SHOWN BY EACH DESIGN. REFER TO MUTCD FOR SPECIFIC GUIDANCE.

STANDARD DRAWING

REFERENCE STANDARD SPEC. SECTION 619

DWG. NO. 619-34

DELINEATOR DETAILS

APPROVED BY
ADMINISTRATOR-HIGHWAY DIVISION

REVISED			
EFFECTIVE	11-1-91		

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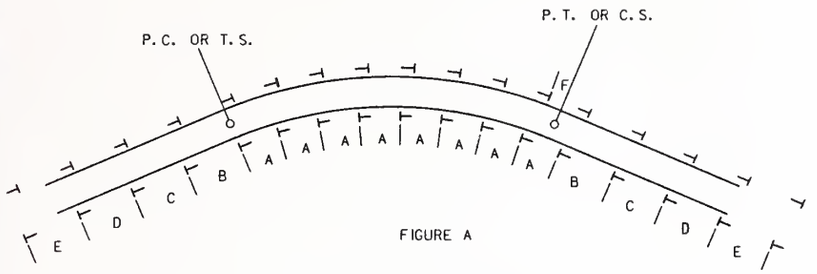

FIGURE A

SEE TABLE 1 FOR SPACING VALUES

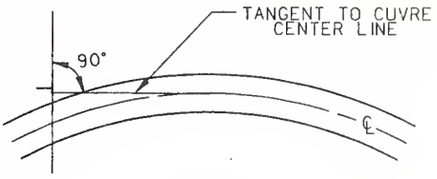

FIGURE B

TABLE 1

HORIZONTAL CURVE SPACING TABLE						
DEGREE OF CUVRE	SPACING ON CUVRE	SPACING ON BOTH APPROACH TANGENTS				
	A	B	C	D	E	
0° + TO 30'	300'	400'	400'	400'	400'	
30' + TO 1°	300'	400'	400'	400'	400'	
1° + TO 2°	225'	400'	400'	400'	400'	
2° + TO 3°	160'	320'	400'	400'	400'	
3° + TO 4°	130'	260'	400'	400'	400'	
4° + TO 6°	110'	220'	330'	400'	400'	
6° + TO 8°	90'	185'	275'	400'	400'	
8° + TO 12°	75'	150'	230'	300'	400'	
12° + TO 20°	60'	125'	185'	300'	400'	
20° PLUS	45'	90'	140'	275'	400'	

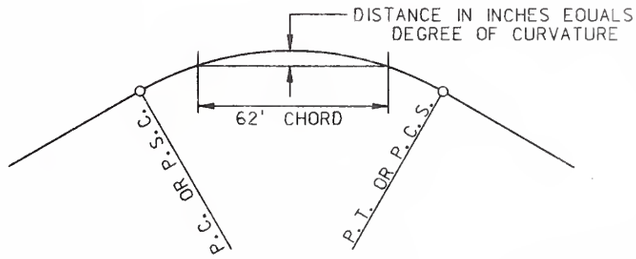

FIGURE C

NOTES

1. REFLECTIVE SHEETING SHALL BE FURNISHED ACCORDING TO STANDARD SPECIFICATIONS FOR REFLECTIVE SHEETING B (HIGH INTENSITY). POSITION DELINEATOR FACES PERPENDICULAR TO TANGENT TO CENTER LINE OF CURVE AS SHOWN IN FIGURE B.
2. DELINEATORS SHALL BE MOUNTED ON 1.12LBS. PER FT. MINIMUM METAL U POSTS WITH 3/16" CADMIUM PLATED BOLT(S). A MINIMUM OF 12 3/8" MAXIMUM DIAMETER HOLES SHALL BE DRILLED OR PUNCHED ON 1' CENTERS FROM THE TOP OF THE POST. 1/4" SQUARE HOLES MAY BE USED. IF SQUARE HOLES ARE USED A LARGE HEADED BOLT OR AN APPROPRIATE WASHER MUST BE USED. THREADS SHALL BE JAMMED AFTER TIGHTENING THE NUT TO PREVENT REMOVAL.
3. DELINEATORS SHALL BE PLACED AT A CONSTANT CLEARANCE FROM THE EDGE OF PAVEMENT EXCEPT WHERE GUARDRAIL OR OTHER OBSTRUCTION INTERFERES. DELINEATORS SHALL THEN BE IN LINE WITH THE INSIDE EDGE OF THE OBSTRUCTION. CLEARANCE FOR DELINEATORS SHALL BE 6'-0" ON INTERSTATE HIGHWAYS, 2'-0" TO 8'-0" ON PRIMARY AND SECONDARY HIGHWAYS AS DETERMINED BY THE PROJECT ENGINEER. STANDARD MOUNTING HEIGHT SHALL BE 4'-0" TO TOP OF POST. POST LENGTHS SHALL BE SUPPLIED TO MAINTAIN THE PROPER MOUNTING HEIGHT AND MINIMUM OF 18" EMBEDMENT.
4. DELINEATORS SHALL BE SPACED ACCORDING TO THE DISTANCES FOUND IN TABLE 1. DELINEATORS THAT ARE TO BE SPACED DIFFERENTLY WILL BE NOTED IN THE PLANS AS TO THEIR PLACEMENT. IN FIGURE A IF "F" DISTANCE IS GREATER THAN 20' ADD ONE REGULAR DELINEATOR IN AT "A" SPACING. UNDER NORMAL SPACING, SHOULD A DELINEATOR FALL WITHIN A CROSSROAD OR APPROACH, IT MAY BE MOVED IN EITHER DIRECTION A DISTANCE NOT TO EXCEED ONE QUARTER OF THE NORMAL SPACING. DELINEATORS STILL FALLING WITHIN SUCH AREAS SHALL BE ELIMINATED.
5. FIGURE C IS A FIELD METHOD FOR DETERMINING DEGREE OF HORIZONTAL CURVES.
6. ALL DELINEATOR REFLECTORS SHALL HAVE 3/4" CORNER RADII EXCEPT DESIGN "E".
7. THE DELINEATOR REFLECTOR SHALL BE MOUNTED 1" BELOW THE TOP OF THE METAL U POST.

STANDARD DRAWING			
REFERENCE STANDARD SPEC. SECTION 704		DWG. NO. 619-36	
DELINEATOR PLACEMENT DETAILS			
APPROVED BY Thomas J. Barnard ADMINISTRATOR-HIGHWAY DIVISION			
REVISED			
EFFECTIVE	11-1-91		

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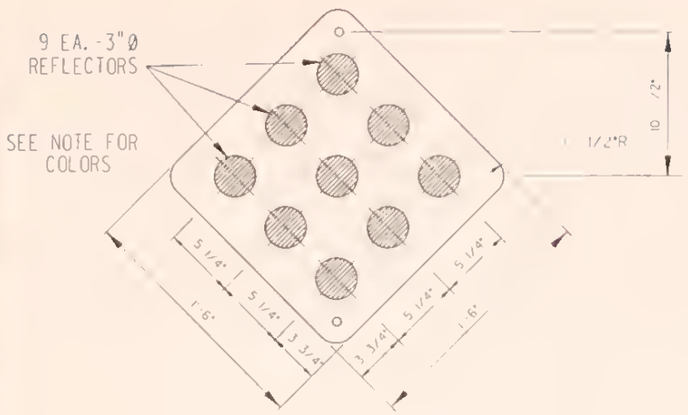
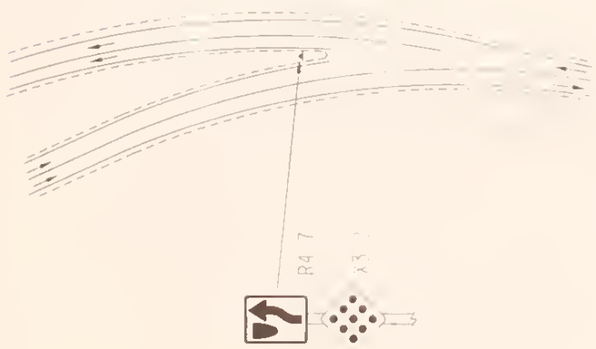
MONTANA CADD

TYPE 1
X3-2

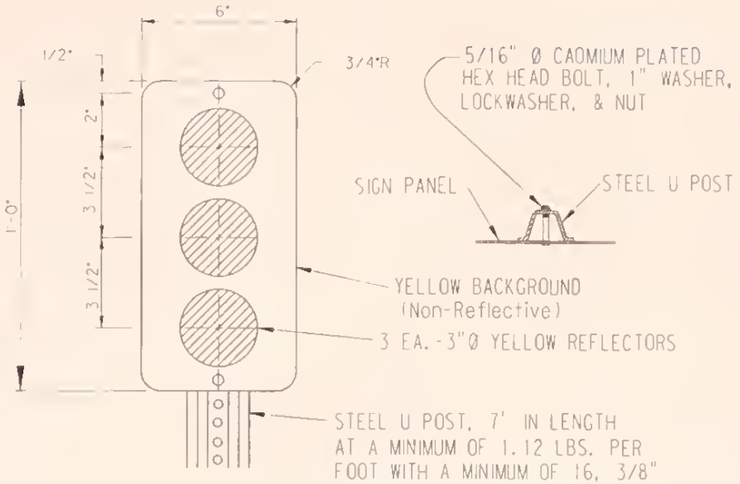


NOTE: TYPE 1 OBJECT MARKERS SHALL HAVE YELLOW REFLECTORS ON A YELLOW OR BLACK BACKGROUND OR BE AN ALL YELLOW REFLECTORIZED PANEL OF THE SAME SIZE. IF USED AS END OF ROAD MARKERS TYPE 1 MARKERS SHALL BE REFLECTORIZED RED OR HAVE RED REFLECTORS ON A RED OR BLACK BACKGROUND.



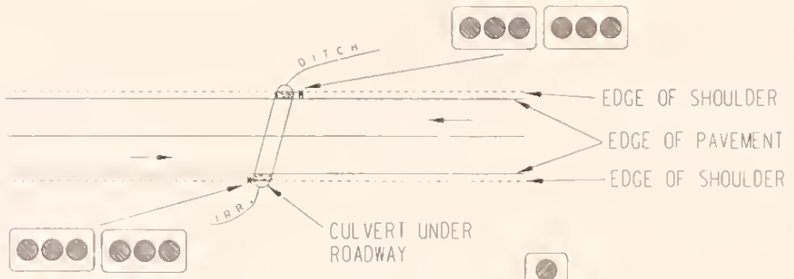
TYPICAL USE AND PLACEMENT

TYPE 2
X3-3


6"
1/2"
3/4"R
2"
3 1/2"
3 1/2"
1'-0"
5/16" Ø CADMIUM PLATED HEX HEAD BOLT, 1" WASHER, LOCKWASHER, & NUT
SIGN PANEL
STEEL U POST
YELLOW BACKGROUND (Non-Reflective)
3 EA. -3"Ø YELLOW REFLECTORS
STEEL U POST, 7' IN LENGTH AT A MINIMUM OF 1.12 LBS. PER FOOT WITH A MINIMUM OF 16, 3/8" MAXIMUM DIA. HOLES DRILLED OR PUNCHED ON 1" CENTERS FROM THE TOP OF THE POST PRIOR TO GALVANIZING.

ALTERNATE DESIGN FOR TYPE 2 OBJECT MARKERS IS A YELLOW REFLECTORIZED PANEL OF THE SAME SIZE.

2 X 3-3 PANELS MOUNTED BACK TO BACK ON STEEL U POST

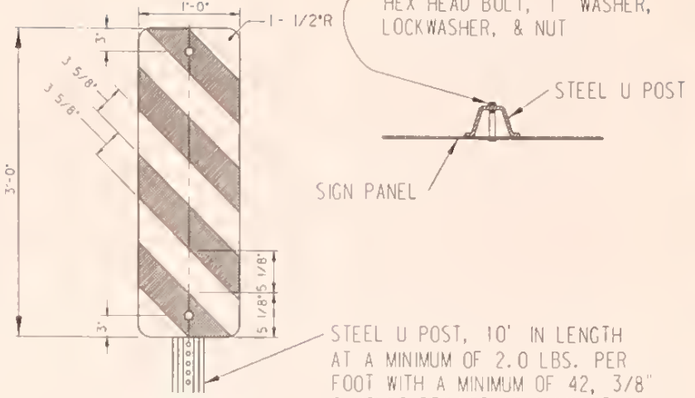


2 X 3-3 PANELS MOUNTED BACK TO BACK ON STEEL U POST

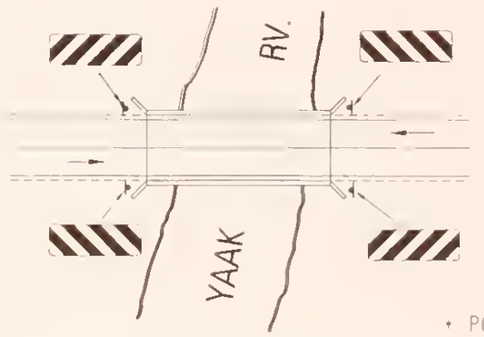
TYPICAL USE AND PLACEMENT

POST AND PANEL(S) TO BE PLACED SO THAT PANEL(S) ARE DIRECTLY ADJACENT TO INNER MOST EDGE OF OBJECT NEAREST TRAVELED WAY.

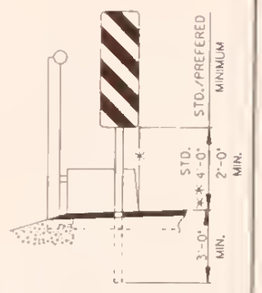
TYPE 3
OM-3
(OM-3L SHOWN)


1'-0"
1 - 1/2"R
3"
3 5/8"
3 5/8"
3'-0"
3"
5 1/8"
5 1/8"
5/16" Ø CADMIUM PLATED HEX HEAD BOLT, 1" WASHER, LOCKWASHER, & NUT
STEEL U POST
SIGN PANEL
STEEL U POST, 10' IN LENGTH AT A MINIMUM OF 2.0 LBS. PER FOOT WITH A MINIMUM OF 42, 3/8" Ø HOLES DRILLED OR PUNCHED ON 1" CENTERS FROM THE TOP OF THE POST PRIOR TO GALVANIZING.

** WHEN MOUNTED 8'-0" OR MORE FROM CURB OR SHOULDER, THE MOUNTING HEIGHT SHALL BE MEASURED FROM THE GROUND LINE INSTEAD OF THE EDGE OF PAVEMENT.



TYPICAL USE AND PLACEMENT



* POST AND PANEL TO BE PLACED SO THAT PANEL EDGE IS FLUSH WITH FACE OF OBJECT NEAREST TRAVELED WAY.

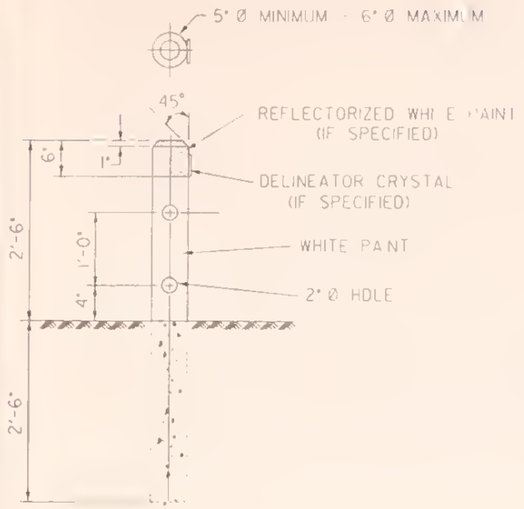
STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG. NO. 619-38

OBJECT MARKER DESIGN AND PLACEMENT DETAILS FOR OBSTRUCTIONS ADJACENT TO OR WITHIN HIGHWAYS

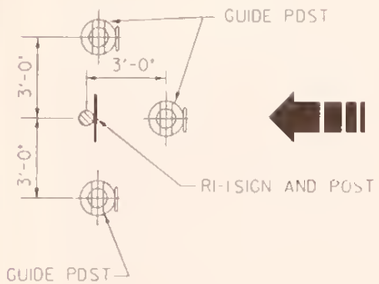
APPROVED BY
ADMINISTRATOR-HIGHWAY DIVISION

REVISED			
EFFECTIVE	11-1-91		

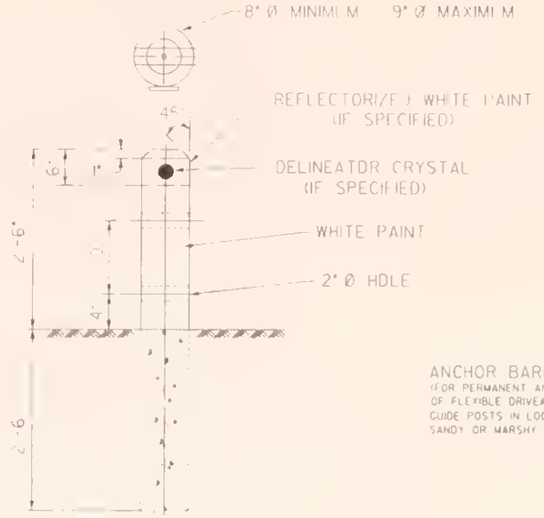
5" DIAMETER WOOD GUIDE POST



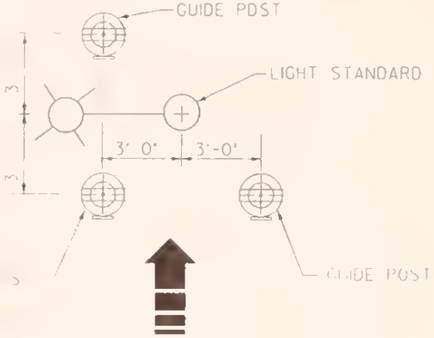
TYPICAL USE AND PLACEMENT



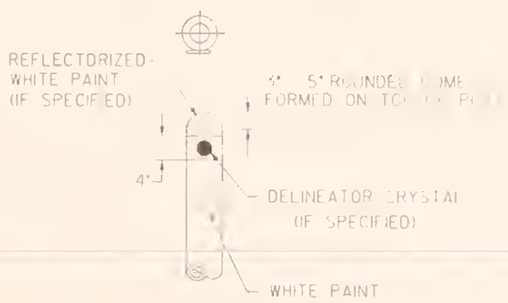
8" DIAMETER WOOD GUIDE POST



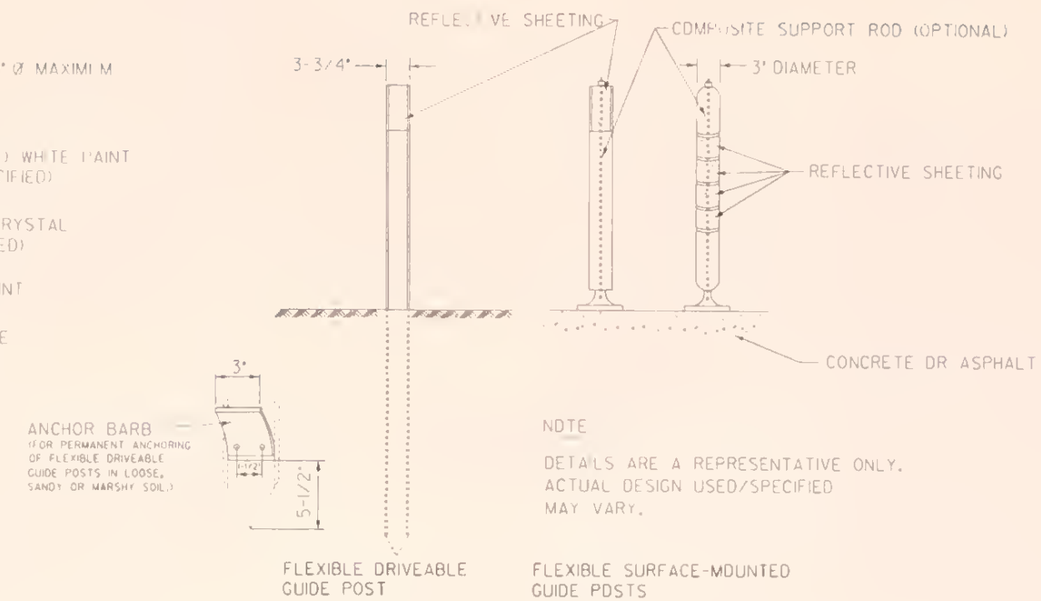
TYPICAL USE AND PLACEMENT



ALTERNATE TOP END FINISH FOR ROUND WOOD GUIDE POSTS



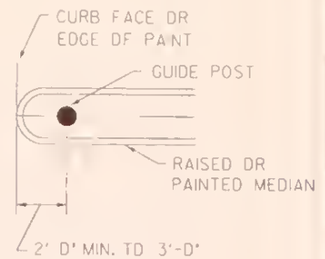
FLEXIBLE GUIDE POST



FLEXIBLE DRIVEABLE GUIDE POST

FLEXIBLE SURFACE-MOUNTED GUIDE POSTS

TYPICAL USE AND PLACEMENT


CURB FACE OR EDGE OF PAVT
GUIDE POST
RAISED OR PAINTED MEDIAN
2' 0" MIN. TO 3'-0" MAXIMUM FROM NOSE OF RAISED OR PAINTED MEDIAN (UNLESS OTHERWISE SPECIFIED)

NOTE

DETAILS ARE A REPRESENTATIVE ONLY. ACTUAL DESIGN USED/SPECIFIED MAY VARY.

NOTES

WOOD GUIDE POSTS

1. WOOD GUIDE POSTS SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THE STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCITON.

2. THE PORTION OF THE WOOD GUIDE POST THAT IS TO BE IN THE GROUND SHALL BE TREATED FOR PROTECTION AS PER THE STANDARD SPECIFICATIONS.

3. THE PORTION OF THE WOOD GUIDE POST THAT IS TO BE ABOVE GROUND SHALL BE PAINTED WITH TWO (2) COATS OF WHITE PAINT AS PER THE STANDARD SPECIFICATIONS.

4. CONTRACTOR HAS CHOICE OF TOP END FINISH FOR WOOD GUIDE POSTS. ALL WOOD GUIDE POSTS FURNISHED ON CONTRACT SHALL HAVE THE SAME TOP END FINISH THROUGHOUT.

5. REFLECTORIZATION OF WOOD GUIDE POSTS, IF REQUIRED IN PLAN SPECIFICATIONS, SHALL BE ACCOMPLISHED BY APPLYING WHITE REFLECTORIZED PAINT ON THE TOP 6 INCH PORTION, AND/OR THE INSTALLATION OF DELINEATOR CRYSTALS AS SPECIFIED.

6. THE EXACT TYPE OF WOOD GUIDE POSTS TO BE USED, THEIR LOCATION, SHALL BE FOUND DETAILED IN THE SIGNING PLANS OF THE CONTRACT.

7. WOOD GUIDE POSTS ARE TO BE USED ONLY [illegible] INVESTIGATION.

FLEXIBLE GUIDE POSTS

1. FLEXIBLE GUIDE POSTS SHALL BE SIMILAR TO THE DESIGN AND SPECIFICATIONS DETAILED ON THIS SHEET OR BE AS SHOWN IN THE SIGNING PLANS OF THE CONTRACT.

2. FLEXIBLE GUIDE POSTS SHALL BE MOUNTED OR EMBEDDED TO THE MANUFACTURERS' SPECIFICATIONS.

3. REFLECTORIZATION OF FLEXIBLE GUIDE POST, IF REQUIRED IN PLAN SPECIFICATIONS, SHALL BE ACCOMPLISHED BY THE ADDITION OF DELINEATOR CRYSTALS, EITHER 1-1/2" x 7" OR 3" DIAMETER, OR BY ADDING TWO 3" MINIMUM WIDTH BANDS OF REFLECTIVE SHEETING (B) 360° AROUND THE TOP OF THE POST. THE COLOR OF THE DELINEATOR CRYSTALS OR REFLECTORIZED MATERIAL SHALL BE FOUND DETAILED IN THE SIGNING PLANS OF THE CONTRACT OR MUTCD.

4. THE EXACT LOCATION AND PLACEMENT OF THE FLEXIBLE GUIDE POSTS SHALL BE FOUND DETAILED IN THE SIGNING PLANS.

= DIRECTION OF VEHICULAR TRAVEL

STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG. NO. 619-40

GUIDE POST DESIGN AND PLACEMENT DETAILS

APPROVED BY [signature] ADMINISTRATOR-HIGHWAY DIVISION

REVISED				
EFFECTIVE	11-1-91			

16105 TASC2 CADD [illegible]

MONTANA CADD
20-SEP-1991 16:13 TRSG2
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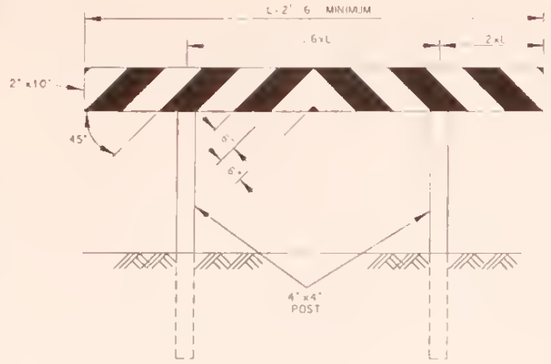
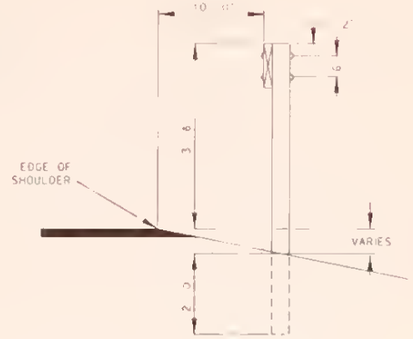


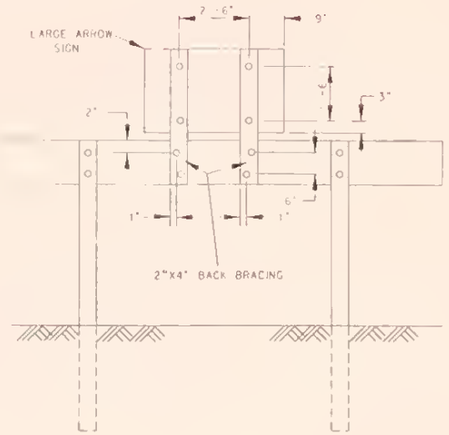
FRONT VIEW
B(I) L & R



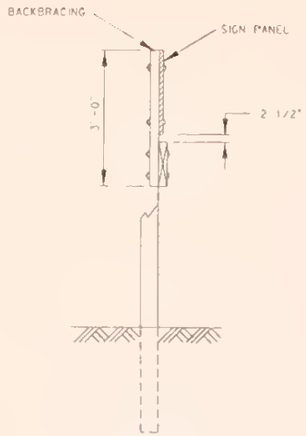
RIGHT
SIDE VIEW

GENERAL BARRICADE DETAILS

BI BARRICADE



REAR VIEW

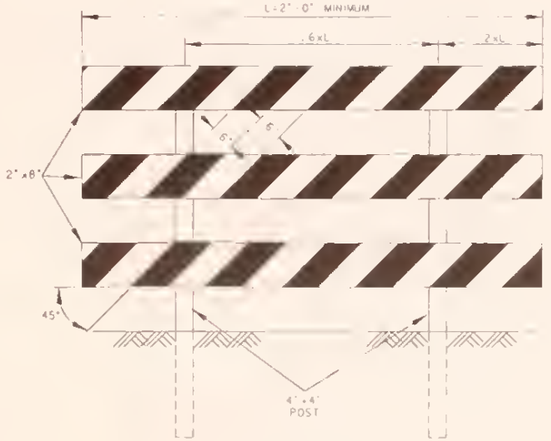


LEFT
SIDE VIEW

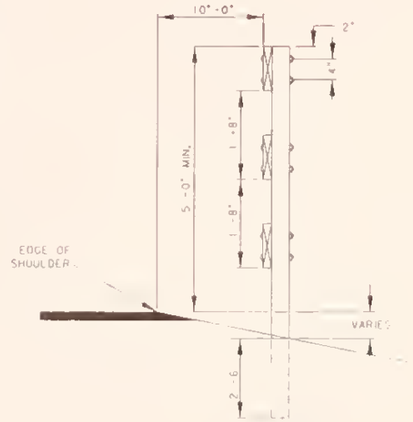
SIGN MOUNTING DETAILS

NOTES:

1. ALL BARRICADES SHALL BE CONSTRUCTED OF COMMERICAL GRADE S4S LUMBER. USE 3/8" GALVANIZED CARRIAGE OR CADMIUM PLATED BOLTS, WASHERS, AND NUTS FOR ALL CONNECTIONS.
2. ALL BARRICADES SHALL BE PAINTED WITH TWO COATS OF WHITE PAINT IN ACCORDANCE WITH SECTION 710 OF THE STANDARD SPECIFICATIONS MANUAL, STATE OF MONTANA-DEPARTMENT OF TRANSPORTATION.
3. ALL BARRICADES SHALL HAVE ALTERNATING REFLECTIVE RED AND WHITE STRIPES, 6" IN WIDTH AT AN ANGLE OF 45° WITH THE VERTICAL, SLANTING DOWNWARD TOWARD THE SIDE OR SIDES ON WHICH TRAFFIC IS TO FLOW. NOMINAL DIMENSIONS OF ROLL MATERIAL FOR STRIPES IS ACCEPTABLE.
4. ALL BARRICADES SHALL BE REFLECTORIZED WITH THE SHEETING MOUNTED ON A SHEET ALUMINUM BACKING AT LEAST 0.019" THICK. ALUMINUM ALLOY 6061-T6 OR AA5052-H38 CONFORMING TO A.S.T.M. DESIGNATION B-209 SHALL BE USED. THIS REFLECTIVE ALUMINUM SHEETING SHALL BE SECURED WITH ALUMINUM NAILS.
5. POST LENGTHS SHALL BE DETERMINED IN THE FIELD, TO COMPLY WITH THE MOUNTING HEIGHTS AND FOUNDATION DEPTHS LISTED ON THIS SHEET.
6. MOVABLE BARRICADES SHALL BE CONSTRUCTED PER CONSTRUCTION STANDARD DRAWING.
7. ALL POSTS NECESSARY TO CONSTRUCT AND INSTALL BARRICADES SHALL BE INCLUDED IN THE ITEM "BARRICADE TYPE, LN. FT."
8. BARRICADES DESIGNATED "R" SHALL BE PLACED TO THE RIGHT SIDE OF APPROACHING TRAFFIC.

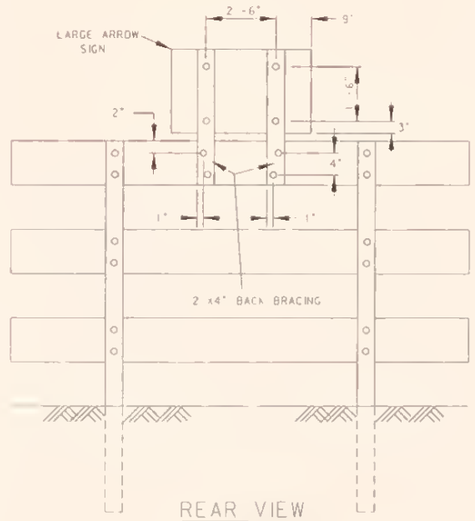


FRONT VIEW
B(II)R

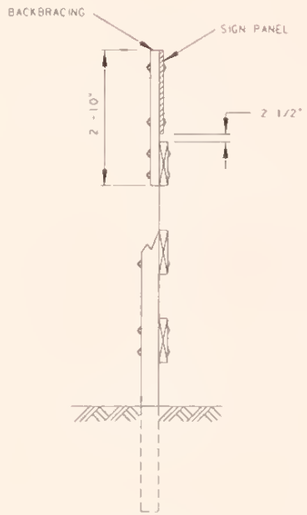


RIGHT
SIDE VIEW

GENERAL BARRICADE DETAILS



REAR VIEW



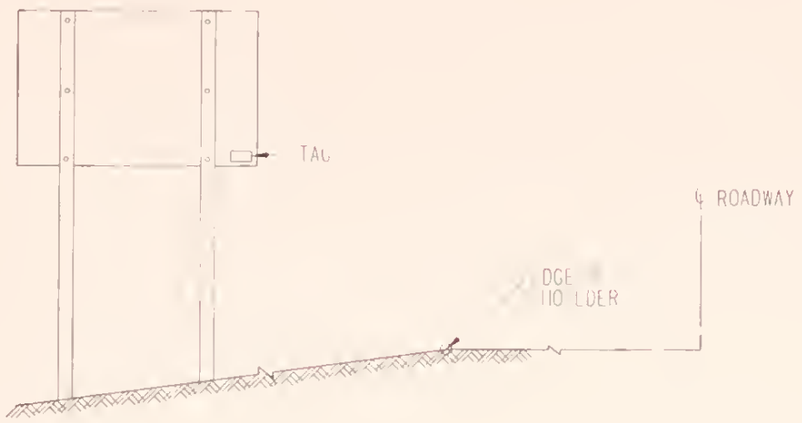
LEFT
SIDE VIEW

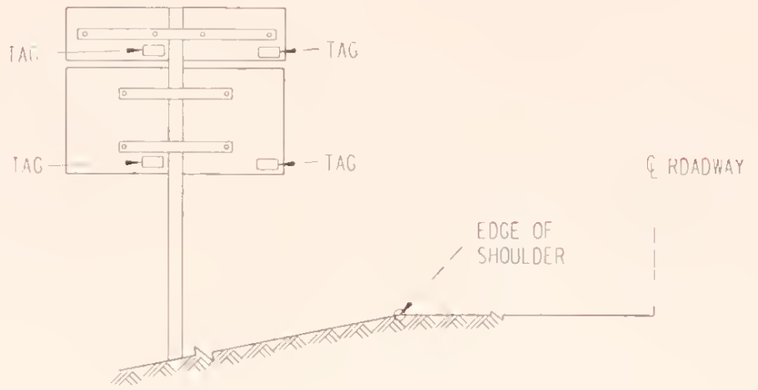
SIGN MOUNTING DETAILS

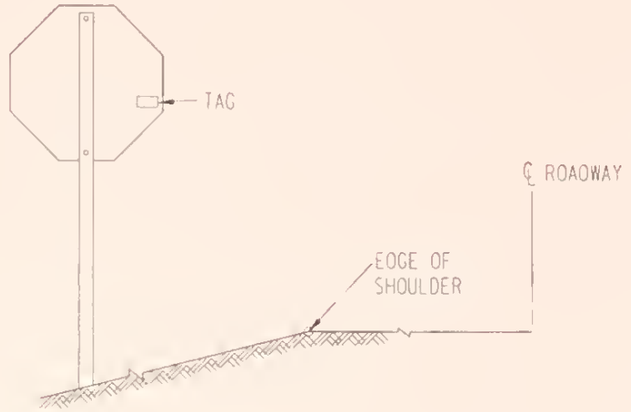
B II BARRICADE

STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG. NO. 619-42
PERMANENT BARRICADE DESIGN DETAILS	
APPROVED BY ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE 11-1-91	

INSTALLATION DATE TAGS
PLACEMENT DETAILS







DATE TAG COLOR SEQUENCE

For years ending with referenced numbers shown, that year's date tag color shall be as follows:

0-Yellow	5-Red
1-White	6-Purple
2-Light Blue	7-Orange
3-Gold	8-Blue
4-Light Green	9-Green

DATE TAG DETAIL

NOTES:

1. Contractors shall furnish and place Installation Date Tags upon all signs before final acceptance of a Project. Cost for labor to accomplish this work shall be included in Sheet Aluminum and/or Aluminum Sheet Increment Items of the Contract.
2. Tags shall display years in which signs were installed. Color for each years tag shall be as shown in the Color Sequence Table shown on this drawing. Date Tags shall be retrareflective.
3. Tags shall be placed upon backs of each sign, located near the lower corner of each sign nearest to edge of roadway, and shall be visible from the roadway as shown in examples shown above.
4. Tags shall also be placed upon any new sign installed in the field as routine maintenance by DOH forces. Maintenance Design Date Tags can be ordered from the Sign Shop in Helena.

STANDARD DRAWING	
REFERENCE STANDARD SPEC. SECTION 619	DWG. NO. 619-44
INSTALLATION DATE TAGS	
APPROVED BY Thomas J. Zimmer ADMINISTRATOR-HIGHWAY DIVISION	
REVISED	
EFFECTIVE 11-1-91	